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ANNUAL REPORT OF THE
GOVERNOR OF THE
PANAMA CANAL, 1941

386

P187

1940/41

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THIRD LOCKS PROJECT.

View near the northerly end of the Gatun Locks cut showing excavation equipment in operation.

ANNUAL REPORT
OF THE
GOVERNOR OF
THE PANAMA CANAL
FOR THE
FISCAL YEAR
ENDED JUNE 30
1941



UNITED STATES
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WASHINGTON : 1941

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REPORTS OF HEADS OF DEPARTMENTS AND DIVISIONS

APPENDIXES NOT PRINTED

The material in the annual report of the Governor of the Panama Canal, published in this volume, is to a large extent a summary of the data presented in the annual reports from the heads of departments and divisions in the Canal organization; the latter, regarded as appendixes to the report of the Governor, are not printed. The annual reports of the Panama Railroad Co. and the health department are published separately; the latter is compiled for calendar years only. The reports of the heads of departments and divisions, as listed below, are on file at the Washington office of the Panama Canal and at the office of the Governor at Balboa Heights, Canal Zone:

Engineer of maintenance, report of.

Special engineering division, report of supervising engineer.

Dredging division, report of superintendent.

Plans section, report of chief.

Assistant engineer of maintenance, report of.

Electrical division, report of acting electrical engineer.

Municipal engineering division, report of municipal engineer.

Locks division, report of superintendent.

Office engineering division, report of acting office engineer.

Section of meteorology and hydrography, report of chief hydrographer.

Marine division, report of marine superintendent.

Mechanical division, report of superintendent.

Supply department, report of chief quartermaster.

Accounting department, report of comptroller.

Executive department:

Division of civil affairs, report of chief.

Police and fire division, report of chief.

Division of schools, report of superintendent.

Panama Canal clubhouses, report of acting director.

Division of personnel supervision and management, report of director of personnel.

Surveying officer (acting), report of.

General counsel, report of.

Real estate section, report of chief.

Public defender, report of.

Paymaster, report of.

Collector, report of.

Magistrates' courts:

Magistrate, Cristobal, report of.

Magistrate, Balboa, report of.

Washington office, report of chief of office and general purchasing officer.

Pardon Board, report of chairman.

Senior aeronautical inspector, report of.

ANNUAL REPORT
OF THE
GOVERNOR OF THE PANAMA CANAL

BALBOA HEIGHTS, CANAL ZONE,
October 7, 1941.

THE SECRETARY OF WAR,
Washington, D. C.

SIR: I have the honor to submit the report of the Governor of the Panama Canal for the fiscal year ended June 30, 1941.

Respectfully,

GLEN E. EDGERTON, *Governor.*

INTRODUCTION

Administration of the affairs of the Panama Canal enterprises involves three main elements: (a) operation and maintenance of the Canal itself; (b) operation of the auxiliary enterprises necessary to provide adequately for the needs of shipping and of the Canal operating forces; and (c) government of the Canal Zone, populated by American civilians, native or tropical workers and their families, and by the United States Army and Navy defense forces.

In addition to these normal elements, during the past two years the Canal organization has performed very important functions as a supply and service agency for the greatly expanded activities of the Army and Navy, particularly in their extensive construction program. While the Canal organization and equipment were not designed for this duty and are by no means fully adequate, the services rendered are regarded as very creditable. These services have contributed materially to the efficiency and economy of the Army and Navy operations, and will continue to do so as long as the present emergency conditions last.

The immediate supervision of the administration of these various activities rests with the heads of the nine major departments and divisions. Responsibility and control of the entire organization are centered in the Governor of the Panama Canal who is also the presi-

dent of the Panama Railroad Co., an adjunct of the Canal enterprise, organized as a Government-owned corporation.

By Executive Order of September 5, 1939, the provisions of Section 13 of the Panama Canal Act, approved August 24, 1912, were invoked as an emergency measure and since that date the Commanding General, Panama Canal Department, United States Army has exercised final authority and jurisdiction over the operation of the Panama Canal and all its adjuncts, appendants, and appurtenances, including control and government of the Canal Zone; and the Governor of the Panama Canal has been subject to that authority and the orders issued under it.

OPERATION AND MAINTENANCE OF THE CANAL

The primary function of the Panama Canal is to provide and maintain a waterway by means of which vessels may make the transit from one ocean to the other, and to handle such traffic as presents itself for transit with a maximum of safety and a minimum of delay. Essentially this involves the maintenance of the waterway, the operation of the locks, and the control of traffic through the Canal. Throughout the year the Canal force maintained its high standard of expeditious service not only in the actual transiting of ships but in providing emergency repairs, fuel, supplies, and the various supplementary services incidental to shipping. There were no interruptions of ship traffic during the year.

OPERATION OF AUXILIARY ENTERPRISES—BUSINESS OPERATIONS

Secondary only to the operation of the Canal is the function of supplying various services to shipping. Commerce requires at the Canal certain adjuncts of shipping, such as fuel oil and coaling plants, storehouses for foodstuffs, ship chandlery, and other essential supplies, marine and railway repair shops, terminal facilities for the transshipment of cargo and passengers, a railroad line across the Isthmus and a steamship line between New York and Panama, quarters and commissaries for the operating force, and other services essential to the economical and efficient operation of the Canal. These services, under coordinated and centralized control, are provided by the various business units of the Panama Canal and Panama Railroad Co. The coordination of such services with the transit of ships through the Canal assists materially in the efficient and economical operation of the waterway. Moreover, in providing marine repair facilities, fuel, and other supplies, the operation of these business units promotes traffic through the Canal.

GOVERNMENT—ADMINISTRATION

The usual functions of government, such as schools, police and fire protection, quarantine, public health, immigration service, posts, customs, aids to navigation, steamboat inspection, hydrographic and meteorological work, water supply, sewers, construction and maintenance of streets, and similar activities, which, in the United States are directed by various officers of the national, State, and municipal governments, are entrusted in the Canal Zone to the Governor, and are executed under his authority and responsibility. This centralization of all governmental activities under one head is essential to economical and efficient administration.

SERVICES RENDERED BY THE CANAL TO SHIPPING

The more important items of the business of the Canal and its adjuncts covering principal services to shipping are expressed numerically in the following table, which presents a comparison of the activities during the fiscal year 1941 with the 2 years immediately preceding:

	Fiscal year 1941	Fiscal year 1940	Fiscal year 1939
Transits of Canal by ocean-going vessels paying tolls.....	4, 727	5, 370	5, 903
Transits of small commercial traffic not counted in ocean-going traffic.....	929	973	914
Free transits of public vessels of the United States and Panama, war vessels of Colombia, and vessels for repairs, etc.....	955	602	664
Total transits.....	6, 611	6, 945	7, 481
Number of lockages during year:			
Gatun Locks.....	5, 103	5, 302	6, 054
Pedro Miguel Locks.....	5, 018	5, 392	6, 283
Miraflores Locks.....	4, 943	5, 286	6, 221
Tolls levied on ocean vessels.....	\$18, 157, 739. 68	\$21, 144, 675. 36	\$23, 661, 021. 08
Tolls on small commercial vessels.....	32, 639. 68	33, 084. 46	38, 408. 94
Total tolls.....	\$18, 190, 379. 36	\$21, 177, 759. 82	\$23, 699, 430. 02
Cargo passing through Canal (tons).....	24, 950, 751	27, 299, 016	27, 866, 627
Net tonnage (Panama Canal measurement) of transiting ocean vessels.....	20, 642, 736	24, 144, 366	27, 170, 007
Cargo per Panama Canal net ton of ocean vessels, laden vessels only.....	1. 369	1. 326	1. 238
Average tolls per ton of cargo, laden vessels only.....	\$0. 657	\$0. 632	\$0. 727
Calls at Canal ports by ships not transiting Canal.....	1, 035	890	831
Cargo handled and transferred at ports (tons).....	2, 390, 618	2, 062, 020	1, 580, 859
Coal, sales and issues (tons).....	87, 446	118, 219	70, 487
Coal, number of commercial ships bunkered.....	211	300	276
Fuel oil pumped (barrels).....	12, 957, 008	12, 492, 347	9, 037, 955
Fuel oil—number of ships served other than vessels operated by the Panama Canal.....	2, 620	2, 455	2, 063
Ships repaired, other than Panama Canal equipment.....	742	779	587
Ships drydocked, other than Panama Canal equipment.....	122	119	119
Provisions sold to commercial ships (commissary sales).....	\$361, 276. 32	\$297, 477. 96	\$307, 342. 16
Chandlery sold to ships (storehouse sales).....	\$76, 554. 05	\$67, 559. 67	\$45, 785. 68

NET REVENUES

The net revenues from Canal operations proper were \$8,852,036.84 as compared with \$11,253,773.49 last year. Net revenues from business operations under the Panama Canal for 1941 were \$1,008,741.70

as compared with \$1,033,886.06 in 1940. The combined net revenues accruing from the Canal and its business units totaled \$9,860,778.54 as compared with \$12,287,659.55 in 1940.

The gross capital investment as of the beginning of the fiscal year was \$559,635,638.06 and the net investment, \$509,170,280.67. Net revenue for the year 1941 produced a return of 1.95 percent on this net investment as against 2.42 for the previous year.

The foregoing figures do not include the Isthmian operations carried on by the Panama Railroad Co., which yielded a net operating income of \$2,645,673.27 for the year, as compared with \$2,497,072.70 for the previous fiscal year, an increase of \$148,600.57 or 6.0 percent.

REPLACEMENTS

The past fiscal year marked the close of 27 years of successful operation of the Panama Canal; in fact, its dependable and efficient service is now taken for granted.

One of the factors which has made this possible is the good condition in which all wearing and deteriorating parts are kept. Of the total capital value of the Panama Canal there are approximately \$100,000,000 of general structural values pertaining to nonbusiness units of the organization, which are subject to deterioration and require regular repair and periodical replacement.

Some of these structures, such as dams and concrete buildings, are still in excellent condition and require but little expenditure for upkeep; but on others deterioration has reached a point where replacement should not longer be deferred. These necessary replacements include not only the frame buildings originally erected to serve during the period of construction of the Canal but also docks, highways, etc., which, due to ordinary deterioration or other conditions, have been rendered inadequate or unserviceable for present requirements or uneconomical to maintain.

Funds for the replacement of worn-out plant and equipment for these nonbusiness units (with the exception of floating plant) must be appropriated by Congress from the general funds of the Treasury, since no funded replacement reserves for these operations are maintained by the Panama Canal. However, in the Canal accounts depreciation charges are made on depreciable property, but the funds covering depreciation charges for nonbusiness units are turned in to the general fund of the Treasury each year and are not available without appropriation. Thus, for this part of the organization, the Panama Canal depends on Congress to provide from these funds (which have been deposited annually in the Treasury in prior years) the necessary replacement of worn-out and obsolete plant to maintain the enterprise up to the standard of operation.

Not only is there demand for replacement of some of the existing facilities but the need also develops for new kinds of facilities. Funds for such new facilities must be obtained by direct appropriation.

For these reasons, it is essential to the continued efficiency of the Canal and to the growth of its facilities to meet the growing demands, that the Bureau of the Budget and the Congress give careful consideration to the requirements submitted annually by the Governor for these purposes.

SECTION I

CANAL OPERATION AND TRADE VIA THE PANAMA CANAL

STATISTICS ON CANAL TRAFFIC

Ocean-going commercial transits¹ through the Panama Canal in the fiscal year 1941 numbered 4,727, the lowest year's traffic since 1933 when the number was 4,162. In comparison with the fiscal year 1940, transits in 1941 showed a decrease of 643, or 12.0 percent, while in comparison with 1939 there was a loss of 1,176 transits, or 19.9 percent.

Tolls collected on the 4,727 vessels making transit in 1941 totaled \$18,157,739.68 in comparison with \$21,144,675.36 in 1940 and \$23,661,021.08 in 1939, decreases of 14.1 percent and 23.3 percent, respectively. The total tolls collection in 1941 was the lowest since 1923 when \$17,504,027.19 were collected.

Net tonnage (Panama Canal measurement) of the vessels transiting in 1941 aggregated 20,642,736, a decrease of 3,501,630 tons, or 14.5 percent, in comparison with 1940, and a decrease of 6,527,271 tons or 24.0 percent, in comparison with 1939. It will be noted that the percentage decrease in net tonnage in 1941 was somewhat greater than in the number of vessels transiting during this period. This is for the reason that there has been a decrease in the size of the vessels using the Canal; in 1941 the average net tonnage (Panama Canal measurement) per vessel transiting was 4,377, as against 4,516 in 1940.

Cargo carried by vessels transiting the Canal in 1941 totaled 24,950,791 long tons, a decline of 2,348,225 tons, or 8.6 percent, in comparison with 1940, and a decrease of 2,915,836 tons, or 10.5 percent as compared with 1939. The decrease in cargo tonnage in 1941 was relatively lower than the decrease in net tonnage of vessels transiting during that period. This is due to fewer vessels transiting in ballast during 1941 and to greater utilization of the space available on laden vessels.

A brief review of traffic from the opening of the Canal on August 15, 1914, indicates that starting with a total of 1,058 transits in the fiscal year 1915 there was a gradual growth of traffic which reached a total of 6,289 transits in the fiscal year 1929. The fiscal year 1929

¹ Includes all toll-paying vessels having a measurement of 300 or more net tons (Panama Canal measurement) or 500 or more displacement tons.

may be considered the record year in Canal traffic with a total of 6,289 transits (an average of 17.2 per day), total tolls of \$27,111,125, and total cargo carried through the Canal of 30,647,768 tons, although the Panama Canal net tonnage of 27,585,000 (estimated in accordance with the present rules of measurement which became effective March 1, 1938) of ships in the fiscal year 1929 was slightly exceeded in the fiscal year 1930 when the Panama Canal net tonnage was 27,716,000 (estimated in accordance with the present rules). From these record levels the world-wide depression reduced Canal traffic during the next four years so that transits numbered only 4,162 in the fiscal year ended June 30, 1933. From that point traffic gradually increased, reflecting the upswing in business conditions, with the result that in 1939 transits were but 6 percent fewer than in the record year 1929. During the early part of the fiscal year 1940 hostilities broke out in Europe. Almost immediately this had an adverse effect upon Canal traffic through disrupted schedules and sailings, notably in the normally important trades between Europe and the west coasts of North and South America. Sailings were further curtailed in the past year with the result that in 1941 traffic dropped to the lowest level in 8 years.

The following table shows a comparison of traffic in the fiscal years 1941 and 1929 and the percentage of the 1941 traffic to the peak traffic of 1929:

	Number of transits	Panama Canal net tonnage	Tolls	Tons of cargo
Fiscal year 1929.....	6,289	27,585,000	\$27,111,125	30,647,768
Fiscal year 1941.....	4,727	20,642,736	\$18,157,740	24,950,791
Percentage of traffic (1941÷1929).....	75.2	74.8	67.0	81.4

As stated previously the combined cargo movement in both directions through the Canal in 1941 showed a decrease of 8.6 percent in comparison with the fiscal year 1940. A break-down of this cargo by direction shows that the tonnage moving from the Atlantic to the Pacific, totaling 9,488,446 tons in 1941, decreased 3.4 percent from that passing through in this direction in 1940, while that moving from the Pacific to the Atlantic, totaling 15,642,345 tons, was off 11.5 percent. The relatively smaller decrease in the Atlantic-to-Pacific movement occurred because the larger proportion of cargo shipped in this direction originates in the United States and other countries in the Western Hemisphere, and thus was less affected by the war. On the other hand, considerable tonnage in the Pacific-to-Atlantic movement in normal times goes to European countries and, since such markets have been limited to a large extent in 1941, a sharp curtailment of shipments to that area resulted.

CANAL TRAFFIC BY FISCAL YEARS 1915 TO 1941

Comparative traffic statistics covering ocean-going vessels for each fiscal year since the Canal was opened to navigation are shown in the following table:

Fiscal year ended June 30—	Number of transits	Panama Canal net tonnage ¹	Tolls	Tons of cargo
1915 ¹	1,058	3,507,000	\$4,366,747.13	4,888,400
1916 ²	724	2,212,000	2,403,089.40	3,093,335
1917.....	1,738	5,357,000	5,620,709.83	7,054,720
1918.....	1,989	6,072,000	6,428,780.26	7,525,768
1919.....	1,948	5,658,000	6,164,200.79	6,910,097
1920.....	2,393	7,898,000	8,507,938.68	9,372,374
1921.....	2,791	10,550,000	11,268,681.46	11,595,971
1922.....	2,665	10,556,000	11,191,828.56	10,882,607
1923.....	3,908	17,206,000	17,504,027.19	19,566,429
1924.....	5,158	24,181,000	24,284,659.92	26,693,167
1925.....	4,592	21,134,000	21,393,718.01	23,956,549
1926.....	5,087	22,906,000	22,919,931.89	26,030,016
1927.....	5,293	24,215,000	24,212,250.61	27,733,555
1928.....	6,253	27,229,000	26,922,200.75	29,615,651
1929.....	6,289	27,585,000	27,111,125.47	30,617,768
1930.....	6,027	27,716,000	27,059,998.94	30,018,429
1931.....	5,370	25,690,000	24,621,599.76	25,065,283
1932.....	4,362	21,842,000	20,694,704.61	19,798,986
1933.....	4,162	21,094,000	19,601,077.17	18,161,165
1934.....	5,234	26,410,000	24,047,183.44	24,704,009
1935.....	5,180	25,720,000	23,307,062.93	25,309,527
1936.....	5,382	25,923,000	23,479,114.21	26,505,943
1937.....	5,387	25,430,000	23,102,137.12	28,108,375
1938.....	5,521	25,950,383	23,169,888.70	27,385,924
1939.....	5,903	27,170,007	23,661,021.08	27,866,627
1940.....	5,370	24,144,366	21,144,675.36	27,299,016
1941.....	4,727	20,642,736	18,157,739.68	21,950,791
Total.....	114,514	514,028,492	492,349,272.95	551,040,482

¹ Canal opened to traffic Aug. 15, 1914.

² Canal closed to traffic approximately 7 months of fiscal year by slides.

³ Panama Canal net tonnage prior to 1939 are estimated figures based on revised measurement rules which became effective Mar. 1, 1938.

TRAFFIC BY MONTHS—FISCAL YEARS 1941 AND 1940

The ocean-going commercial traffic during each month of the fiscal year 1941 is summarized in the following table, in which are inserted for comparison corresponding figures for the preceding year:

Month	Number of transits		Panama Canal net tonnage		Tons of cargo		Tolls	
	1940-41	1939-40	1940-41	1939-40	1941-40	1939-40	1941-40	1939-40
July.....	431	485	1,903,936	2,254,398	2,285,010	2,317,697	\$1,735,553.52	\$1,974,380.72
August.....	434	490	2,031,910	2,247,009	2,418,324	2,385,039	1,781,334.54	1,964,776.48
September.....	420	457	2,021,570	2,119,418	2,304,195	2,445,700	1,771,398.18	1,855,574.22
October.....	462	458	2,078,534	2,068,665	2,418,104	2,386,314	1,820,111.76	1,815,210.24
November.....	387	489	1,711,174	2,178,556	2,061,753	2,472,503	1,510,594.56	1,915,075.38
December.....	412	489	1,769,812	2,116,424	2,128,606	2,361,176	1,553,326.02	1,840,096.98
January.....	404	466	1,637,598	2,056,658	1,965,675	2,337,943	1,437,169.56	1,795,241.88
February.....	363	402	1,537,568	1,782,977	1,827,094	2,123,574	1,360,327.26	1,567,416.06
March.....	394	470	1,608,835	2,090,902	1,911,110	2,270,432	1,413,441.54	1,832,416.98
April.....	368	376	1,550,938	1,704,951	2,056,995	2,081,483	1,379,378.02	1,508,200.86
May.....	352	419	1,501,849	1,871,695	1,988,697	2,319,372	1,330,773.81	1,648,035.78
June.....	290	369	1,159,012	1,644,313	1,585,228	1,788,783	1,064,330.88	1,428,249.78
Total.....	4,727	5,370	20,642,736	24,144,366	24,950,791	27,299,016	18,157,739.68	21,144,675.36
Average per month.....	394	448	1,720,228	2,012,031	2,079,233	2,274,918	1,513,144.97	1,762,056.21

TANKER TRAFFIC

During the past 19 years tanker traffic has at times been one of the most important features of shipping through the Canal. The peak of tanker traffic occurred in the fiscal year 1924, when an average of 4.7 tankers per day passed through the Panama Canal. For many years thereafter tanker traffic comprised between 20 and 40 percent of the total Canal traffic. The most important phase of this tanker traffic has been the shipment of mineral oils from the California oil fields to the east coast of the United States. While the United States intercoastal still constitutes an important movement of tanker traffic through the Canal, during the past year it accounted for only 143 (a daily average of only 0.4 transits) out of the total of 323 tanker transits. Other tanker shipments are principally from the oil fields in the West Indies and in Peru.

Tanker traffic in the fiscal year 1941 was the lowest it has been in any fiscal year since 1923, the first year for which segregated statistics on tankers were compiled. Tankers accounted for only 8.4 percent of the total net tonnage, Panama Canal measurement, put through the Canal during the past year and for only 7.9 percent of the total tolls received. The two tables below show the traffic divided between tank ships and all other ocean-going commercial vessels, classified herein as "all other."

Number and daily average transits of tankers and all other carriers

Fiscal year	Ocean-going commercial transits			Daily average		
	Tankers	All other	Total	Tankers	All other	Total
1923.....	913	2,995	3,908	2.5	8.2	10.7
1924.....	1,704	3,454	5,158	4.7	9.4	14.1
1925.....	1,079	3,513	4,592	3.0	9.6	12.6
1926.....	1,090	3,997	5,087	3.0	11.0	14.0
1927.....	1,324	3,969	5,293	3.6	10.9	14.5
1928.....	1,121	5,132	6,253	3.0	14.0	17.0
1929.....	1,083	5,206	6,289	3.0	14.2	17.2
1930.....	1,218	4,809	6,027	3.3	13.2	16.5
1931.....	944	4,426	5,370	2.6	12.1	14.7
1932.....	612	3,750	4,362	1.7	10.2	11.9
1933.....	636	3,526	4,162	1.7	9.7	11.4
1934.....	942	4,292	5,234	2.6	11.7	14.3
1935.....	791	4,389	5,180	2.2	12.0	14.2
1936.....	598	4,784	5,382	1.6	13.1	14.7
1937.....	643	4,744	5,387	1.8	13.0	14.8
1938.....	562	4,962	5,524	1.5	13.6	15.1
1939.....	580	5,323	5,903	1.6	14.6	16.2
1940.....	495	4,875	5,370	1.4	13.3	14.7
1941:						
July.....	36	395	431	1.2	12.7	13.9
August.....	36	398	434	1.2	12.8	14.0
September.....	40	390	430	1.3	13.0	14.3
October.....	42	420	462	1.4	13.5	14.9
November.....	20	367	387	.7	12.2	12.9
December.....	23	389	412	.8	12.5	13.3
January.....	21	383	404	.7	12.3	13.0
February.....	18	345	363	.6	12.4	13.0
March.....	28	366	394	.9	11.8	12.7
April.....	22	346	368	.8	11.5	12.3
May.....	18	334	352	.6	10.8	11.4
June.....	19	271	290	.6	9.1	9.7
Total.....	323	4,404	4,727	.9	11.2	12.1

Panama Canal net tonnage and tolls of tankers and all other ocean-going commercial vessels

Fiscal year	Panama Canal net tonnage			Tolls paid by shipping using Canal		
	Tankers	All other	Total	Tankers	All other	Total
1923	5,326,000	11,880,000	17,206,000	\$4,769,324.63	\$12,734,702.56	\$17,504,027.19
1924	10,120,000	14,061,000	24,181,000	9,071,835.65	15,212,824.27	24,284,659.92
1925	6,367,000	14,767,000	21,134,000	5,728,302.26	15,665,415.75	21,393,718.01
1926	6,286,000	16,620,000	22,906,000	5,626,167.93	17,263,763.96	22,919,931.89
1927	7,555,000	16,690,000	24,245,000	6,658,806.90	17,553,433.71	24,212,250.61
1928	6,188,000	21,041,000	27,229,000	5,436,437.16	21,485,763.59	26,922,200.75
1929	5,792,000	21,731,000	27,523,000	5,145,632.19	21,965,493.28	27,111,125.47
1930	6,505,000	21,211,000	27,716,000	5,768,963.28	21,291,035.66	27,059,998.94
1931	5,237,000	20,453,000	25,690,000	4,682,320.14	19,942,279.62	24,624,599.76
1932	3,538,000	18,304,000	21,842,000	3,197,136.29	17,497,568.32	20,694,704.61
1933	3,775,000	17,319,000	21,094,000	3,393,311.02	16,207,766.15	19,601,077.17
1934	5,760,000	20,650,000	26,410,000	5,161,787.40	18,885,396.04	24,047,183.44
1935	4,635,000	21,085,000	25,720,000	4,192,863.09	19,114,199.84	23,307,062.93
1936	3,456,000	22,467,000	25,923,000	3,192,498.46	20,286,615.75	23,479,114.21
1937	3,714,000	21,716,000	25,430,000	3,451,771.65	19,650,365.47	23,102,137.12
1938	3,190,033	22,760,350	25,950,383	2,846,711.79	20,323,176.91	23,169,888.70
1939	3,361,367	23,808,640	27,170,007	2,766,289.86	20,894,731.22	23,661,021.08
1940	2,756,437	21,387,929	24,144,366	2,273,539.32	18,871,136.04	21,144,675.36
1941	1,730,248	18,912,488	20,642,736	1,435,916.34	16,721,823.34	18,157,739.68

SUMMARY OF PASSENGER MOVEMENT AT CANAL DURING 1941

The following tabulation shows by months the number of passengers, exclusive of transients, disembarking at Canal Zone ports during the fiscal year 1941, segregated between first-class and all others, with comparative totals for the fiscal years 1940 and 1939:

	Passengers disembarking			Passengers embarking		
	First-class	Others	Total	First-class	Others	Total
July	1,994	835	2,829	1,431	1,090	2,521
August	1,929	1,501	3,430	1,801	2,076	3,877
September	2,283	2,537	4,820	1,653	1,611	3,264
October	2,286	4,147	6,433	1,142	750	1,892
November	1,927	2,212	4,139	1,156	1,315	2,471
December	1,770	2,507	4,277	1,328	794	2,122
January	1,992	2,559	4,551	1,139	1,040	2,179
February	2,011	1,648	3,659	1,195	518	1,713
March	1,754	2,807	4,561	1,846	1,400	3,246
April	1,893	2,691	4,584	2,100	2,377	4,477
May	1,917	3,033	4,950	2,408	864	3,272
June	1,879	3,510	5,389	2,293	1,682	3,975
Total, 1941	23,635	29,987	53,622	19,492	15,517	35,009
Total, 1940	21,953	24,284	46,237	17,739	14,342	32,081
Total, 1939	19,073	16,368	35,441	18,833	16,609	35,442

As compared with 1940, the fiscal year 1941 showed an increase of 16.0 percent in the number of arrivals, and in comparison with 1939 an increase of 5.1 percent; in the number of departures there was an increase of 9.1 percent in comparison with 1940 but a decrease of 1.2 percent under 1939.

The following table shows the passenger traffic through the ports of Cristobal and Balboa during the past 3 years.

	Port of Cristobal			Port of Balboa		
	1941	1940	1939	1941	1940	1939
Passengers disembarking.....	35,764	31,435	26,799	17,858	14,802	8,642
Passengers embarking.....	24,431	23,012	26,448	10,578	9,069	8,994

A further segregation of the passenger movement shows that 45,387 incoming and 27,688 outgoing passengers came from or were destined to ports of the Atlantic, and 8,235 incoming and 7,321 outgoing passengers were brought from or were destined to ports of the Pacific.

TRANSIENT PASSENGERS

In addition to the figures shown above of passengers disembarking and embarking, there were 79,954 transient passengers brought to the Isthmus by vessels calling at Canal ports during the fiscal year 1941. For the fiscal year 1940 there were 90,666 and in the fiscal year 1939 there were 114,053. The number in 1941 decreased 10,712, or 11.8 percent, in comparison with those in 1940, and registered a decline of 34,099, or 29.9 percent, under 1939. Most of these passengers came ashore for short periods but since they departed on the same vessels on which they arrived they are not included in the tabulation of passengers ending or beginning voyages at the Isthmus. The origin and destination of these transient passengers are indicated in the following tabulation:

	Fiscal year 1941	Fiscal year 1940	Fiscal year 1939
Remaining on board vessels transiting Canal:			
Atlantic to Pacific.....	40,737	53,351	48,058
Pacific to Atlantic.....	24,918	23,334	30,750
Remaining on board vessels entering port but not transiting Canal:			
Atlantic to Atlantic.....	12,430	12,672	33,996
Pacific to Pacific.....	1,869	1,309	1,249
Total.....	79,954	90,666	114,053

Prior to the outbreak of the European war there had been a great number of passengers visiting the Canal as members of special tourist cruises. There has been a very sharp decline in this activity in the past two years as evidenced by the statistics of passengers on board vessels from the Atlantic Ocean not transiting the Canal.

CANAL OPERATION AND MAINTENANCE

HOURS OF OPERATION

Dispatching of ships through the Canal is conducted on schedules. Vessels awaiting transit begin moving through the Canal from the terminal ports at 6 a. m. and dispatches are made thereafter from each

terminus at intervals of one hour. The following is a summary of the arrangements in effect at the end of the fiscal year:

From Cristobal Harbor, first ship at 6 a. m., last at about 3 p. m.; from Balboa anchorage, first ship at 6 a. m., last at 2:30 p. m.

Tankers and vessels carrying hazardous cargoes are dispatched at the discretion of the Port Captain and are not permitted to proceed unless they can clear the locks before dark.

Special precautions and regulations for handling ships in the locks were continued throughout the year.

OPERATING SCHEDULE OF LOCKS

At the end of the fiscal year, the schedules of operating shifts of the locks were as follows:

Gatun:

- 7 a. m. to 3 p. m.—8 locomotives.
- 7:45 a. m. to 3:45 p. m.—6 locomotives.
- 3 p. m. to 11 p. m.—8 locomotives.
- 3:45 p. m. to 11:45 p. m.—6 locomotives.
- 11 p. m. to 7 a. m.—8 locomotives.

Pedro Miguel:

- 8 a. m. to 4 p. m.—8 locomotives.
- 4 p. m. to 12 m.—8 locomotives.

Miraflores:

- 7 a. m. to 3 p. m.—8 locomotives.
- 9 a. m. to 5 p. m.—8 locomotives.
- 5 p. m. to 1 a. m.—8 locomotives.

LOCKAGES AND LOCK MAINTENANCE

Lockages and vessels handled are shown in the following table by months for the past fiscal year, with corresponding totals for the past 5 years:

Month	Gatun		Pedro Miguel		Miraflores		Total	
	Lockages	Vessels	Lockages	Vessels	Lockages	Vessels	Lockages	Vessels
1940								
July	447	684	455	669	446	633	1,348	1,986
August	463	639	461	641	452	619	1,376	1,899
September	446	661	447	632	440	640	1,333	1,933
October	469	718	458	645	458	663	1,385	2,026
November	408	626	402	605	401	600	1,211	1,831
December	432	659	417	589	414	588	1,263	1,836
1941								
January	429	635	437	631	427	633	1,293	1,899
February	390	615	380	593	377	596	1,147	1,804
March	411	686	431	699	415	682	1,257	2,067
April	390	625	401	653	398	630	1,192	1,908
May	379	573	379	564	377	583	1,135	1,720
June	439	897	347	568	338	543	1,124	2,008
Total	5,103	8,018	5,018	7,489	4,943	7,410	15,064	22,917
Fiscal year:								
1940	5,302	7,713	5,392	7,643	5,286	7,570	15,980	22,926
1939	6,054	7,929	6,283	8,064	6,221	7,988	18,558	23,981
1938	5,651	7,385	5,870	7,420	5,813	7,316	17,334	22,121
1937	5,504	7,156	5,735	7,474	5,608	7,218	16,847	21,848
1936	5,334	6,755	5,548	6,930	5,538	6,866	16,420	20,551

The lock-operating machinery functioned smoothly throughout the year except for a few incidents due to faulty operation or minor failure of equipment. The following summary includes all delays to vessels while transiting the locks, due to the incidents mentioned:

	Number of vessels delayed	Aggregate delay caused all vessels
Gatun.....	17	4 hours 28 minutes.
Pedro Miguel.....	15	3 hours 21 minutes.
Miraflores.....	14	2 hours 24 minutes.
Total.....	46	10 hours 13 minutes.

The average number of lockages made daily, and the average number of vessels handled per lockage, during each of the past 5 fiscal years, are shown in the following table:

Fiscal year	Average number of lockages per day			Average number of lockage vessels per		
	Gatun	Pedro Miguel	Miraflores	Gatun	Pedro Miguel	Miraflores
1941.....	14.0	13.7	13.6	1.57	1.49	1.50
1940.....	14.5	14.8	14.5	1.45	1.41	1.42
1939.....	16.6	17.2	17.0	1.31	1.28	1.28
1938.....	15.5	16.1	15.9	1.31	1.26	1.29
1937.....	15.1	15.7	15.4	1.30	1.30	1.24

By the end of the year, special construction work by the Municipal, Mechanical, and Electrical Divisions was in full progress at all locks. While most of this construction is being performed by those divisions, much work is required of the regular locks forces in altering, relocating, and protecting operating machinery and equipment so as to avoid interference with permanent installations.

POWER FOR CANAL OPERATION

The power system was operated throughout the year with a combined output of 132,933,684 kilowatt-hours compared with a combined generator output of 98,425,998 kilowatt-hours for the preceding fiscal year. During the year 119,553,193 kilowatt-hours were distributed to consumers as compared with 90,814,522 kilowatt-hours for the preceding fiscal year. From the above there resulted a transmission, transformation, and distribution loss of 13,380,491 kilowatt-hours, or 10.06 percent, as compared with 7,611,476 kilowatt-hours, or 7.73 percent, for the preceding year. The maximum peak load carried on the system during the past fiscal year was 28,000 kilowatts, occurring on May 2, 1941.

The Madden hydroelectric generating station and the Gatun hydroelectric station operated throughout the year, generating 62.3

percent and 37.7 percent of the power, respectively. The Miraflores Diesel-electric station continued on a full-time stand-by basis during the entire year; Diesel engines were operated on one occasion only during the year for load purpose, due to removal of a transformer unit for replacing insulating oil.

During the year detailed specifications were prepared for the purchase of one 10,000-kv.-a. electric generator, with auxiliary equipment, for installation in the Madden hydroelectric station; this generator is needed to take care of the increasing demand for electric current. At the Gatun hydroelectric station there was installed a 1,400-ampere switch gear, control wiring, and miscellaneous equipment for sectionalizing main 6,600-volt busses; also necessary supervisory equipment for control of additional circuit-breaker installations at Gatun and Cristobal substations. The overhaul of governor mechanisms for all generators, including the manufacture of anti-hunting bars for improving governor action, was accomplished during the year at the Gatun hydroelectric station.

There were no transmission-line failures causing interruptions to service to substations.

WATER SUPPLY

The inflow of water during the past 2 years from all portions of Gatun Lake drainage basin as well as the utilization and losses of the water are summarized in the table below. Each year covers the 12 months ended June 30 and thus embraces the cycle of a dry and rainy season.

	Billion cu. ft., fiscal year—		Percent of total yield, fiscal year—	
	1941	1940	1941	1940
Yield from Madden Lake drainage basin	65.84	66.09	43.0	36.3
Yield from land area downstream from Madden Dam	52.12	75.89	34.0	41.7
Direct rainfall on Gatun Lake surface	35.24	40.09	23.0	22.0
Total yield	153.20	182.07	100.0	100.0
Evaporation from lake surfaces	22.50	22.61	14.7	12.4
Gatun Lake lockages	37.06	39.27	24.2	21.6
Gatun hydroelectric power	40.27	31.56	26.3	17.3
Gatun spillway waste	46.55	84.40	30.4	46.4
Storage, increase or decrease (—)	4.63	2.45	3.0	1.3
Leakage and municipal	2.19	1.78	1.4	1.0
Total uses and losses	153.20	182.07	100.0	100.0

The 1941 total yield of 153.20 billion cubic feet represents an average inflow of 4,858 cubic feet per second, which is 27 percent below the 27-year annual average of 6,627 cubic feet per second. Operation of the Gatun spillway during the fiscal year 1941 totaled 1,309 gate-hours and of the Miraflores spillway, 310 gate-hours.

DRY SEASON—1941

During the dry season the run-off from the Gatun Lake drainage basin is not sufficient to supply the Panama Canal requirements for lockages and generation of power, and draft on reserve storage in Madden and Gatun Lakes becomes necessary to make up the deficiency. The 1941 dry season period, during which draft on reserve water storage was necessary, began December 12, 1940, and ended May 24, 1941, a duration of 164 days. This is one of the longest dry season periods on record, but the average inflow was considerably higher than for the average dry season and the reserve water storage was ample for Panama Canal uses. The total yield of the Gatun Lake drainage basin for the 5½ months of the 1941 dry season amounted to 27.19 billion cubic feet. Of this amount, 11.96 billion cubic feet were lost by evaporation from Gatun and Madden Lake surfaces, leaving a net yield of 15.23 billion cubic feet available for useful purposes. As dry season water requirements amounted to 36.21 billion cubic feet, it was necessary to draw 20.98 billion cubic feet from reserve storage in Gatun and Madden Lakes. This draft on storage is equivalent to 4.60 feet depth on Gatun Lake, or to Madden Lake capacity at elevation 237.57 feet. The elevations of both Gatun and Madden Lakes during the 1941 dry season were regulated by spilling at Madden Dam. The elevation of Gatun Lake varied between a maximum of 86.21 feet on January 5, 1941, and a minimum of 83.47 feet on May 24, 1941.

FLOODS

No floods of any magnitude occurred over any portion of the Gatun Lake drainage basin during the calendar year 1940 or from January to June 1941. During the calendar year 1940, the run-off over the Gatun Lake area was below normal for all months from April to December. The maximum discharge at Madden Dam during the fiscal year 1941 was 14,200 cubic feet per second on April 5, 1941. The maximum spilling at Gatun spillway was during the operation of six gates on October 19 and 20, 1940, with a maximum discharge of 70,000 cubic feet per second.

MADDEN LAKE

Madden Lake began the fiscal year 1941 at elevation 230.99 feet. The lake was allowed to rise until sill elevation of the Madden Dam spillway, 232 feet, was attained on July 24, at which time free flow conditions over the dam were established. Free flow conditions continued until November 1, when the drum gates were raised to elevation 250 feet. Madden Lake had filled to elevation 245 feet by November 25 and was held near this elevation by needle valve spilling until the beginning of the dry season. As the dry season run-off into

Madden Lake was closely equivalent to the water consumption at the Madden power station, lake levels fell only slightly, being at approximately elevation 243 feet on April 1. In order to allow overhaul of Madden Dam drum gates, lake elevations were lowered to approximately 229 feet between April 1 and 10. The minimum elevation for the year, 227.50 feet, was reached on May 29 and 30. Thereafter the lake was allowed to rise, reaching elevation 237.97 feet on June 30, 1941.

MADDEN DAM

Observations on possible seepage through the ridges adjacent to Madden Dam and observations on uplift pressure and gallery drain seepage in the dam were continued throughout the year.

MAINTENANCE OF CHANNEL—OTHER DREDGING ACTIVITIES

Dredges worked throughout the year dredging and maintaining the Canal channel and terminal harbors from deep water of the Atlantic entrance to deep water in the Pacific; work also was continued on various authorized special maintenance projects. In addition, dredging operations on the wet excavation of the New Gatun Locks bypass channel, Atlantic entrance, and the New Miraflores Locks bypass channel, Pacific entrance, was inaugurated during the year. Excavation during the year is summarized in the following table:

Location	Earth	Rock	Total
<i>Canal prism dredging</i>			
	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>
Atlantic entrance, maintenance.....	652,300		652,300
Gatun Lake, maintenance.....	321,100	22,200	343,300
Gaillard Cut:			
Maintenance, including slides.....	204,900	198,100	403,000
Project No. 13.....	157,700	534,300	692,000
Miraflores Lake, maintenance.....	7,400		7,400
Pacific entrance:			
Maintenance.....	62,100	18,100	80,200
Project No. 1-B.....	26,200	3,800	30,000
Total Canal prism.....	1,431,700	776,500	2,208,200
<i>Auxiliary dredging</i>			
Balboa harbor:			
Maintenance.....	76,800		76,800
Project No. 1, extension No. 2.....	65,500		65,500
Colon fill.....	243,700	59,600	303,300
Gatun Lake (auxiliary).....	31,100		31,100
Gaillard Cut (auxiliary).....	5,200	98,200	103,400
United States Army cable trench.....	24,000	1,500	25,500
Gatun Locks, lower east chain fender.....	200		200
Chagres River gravel service:			
Run-of-bank gravel.....	443,000		443,000
Stripping gravel beds.....	516,800		516,800
Total auxiliary dredging.....	1,407,200	159,300	1,566,500
<i>Third Locks bypass channels</i>			
New Gatun Locks bypass channel, Atlantic entrance.....	1,958,200	40,800	1,999,000
New Miraflores Locks bypass channel, Pacific entrance.....	1,285,600	272,400	1,558,000
Total Third Locks bypass channels.....	3,243,800	313,200	3,557,000
Grand total, fiscal year 1941.....	6,082,700	1,249,000	7,331,700
Grand total, fiscal year 1940.....	4,278,550	1,450,000	5,728,550

¹ 26,100 cubic yards of this amount is from Mindi Diversion channel.

² In addition 125,245 cubic yards of Chame sand produced by craneboat *Atlas*.

³ In addition 28,005 cubic yards of Chame sand produced by craneboat *Atlas*.

Dredging operations are divided into three major districts: the Northern District, from contour 42 feet below mean sea level in the Atlantic Ocean to Gamboa; the Central District (Gaillard Cut), from Gamboa to Pedro Miguel locks; the Southern District, from Pedro Miguel locks to contour 50 feet below mean sea level in the Pacific Ocean. Excavation in these three areas, exclusive of the Third Locks excavation, is summarized as follows:

	Northern	Central	Southern	Total
Canal prism:	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>
Earth.....	973, 400	362, 600	95, 700	1, 431, 700
Rock.....	22, 200	732, 400	21, 900	776, 500
Total.....	995, 600	1, 095, 000	117, 600	2, 208, 200
Auxiliary:				
Earth.....	275, 000	5, 200	167, 200	447, 400
Rock.....	59, 600	98, 200	1, 500	159, 300
Total.....	334, 600	103, 400	168, 700	606, 700
Total (exclusive of Third Locks):				
Earth.....	1, 248, 400	367, 800	262, 900	1, 879, 100
Rock.....	81, 800	830, 600	23, 400	935, 800
Grand total:				
Fiscal year 1941.....	1, 330, 200	1, 198, 400	286, 300	1 2, 814, 900
Fiscal year 1940.....	3, 394, 750	1, 477, 300	337, 700	1 5, 209, 750

¹ Does not include Chagres River gravel or Chame sand service.

ORDINARY CHANNEL MAINTENANCE

Northern District (Atlantic entrance, Cristobal Harbor and Gatun Lake).—Maintenance dredging in the Atlantic entrance section of the Canal channel was in progress for a total of 32 days during the year, with the pipe line suction dredge *Las Cruces* dredging a total of 652,300 cubic yards of material, all of which was earth. Dipper dredges *Cascadas*, *Gamboa*, and *Paraíso* and the suction dredge *Las Cruces* performed the maintenance dredging in the Gatun Lake section. The total dredging for the year in this section amounted to 343,300 cubic yards, of which 22,200 cubic yards were unmined rock and 321,100 cubic yards earth. Fifty dredging days were consumed in the performance of this work.

Central District (Gaillard Cut).—Maintenance dredging in Gaillard Cut (exclusive of slide excavation) amounted to 187,000 cubic yards, with the dipper dredges *Cascadas*, *Gamboa*, and *Paraíso* and the suction dredge *Las Cruces* working a total of 39 days.

Southern District (Pacific entrance, Balboa Harbor and Miraflores Lake).—Maintenance dredging in the Pacific entrance was performed by the dipper dredges *Cascadas* and *Gamboa* and the craneboat *Atlas*, working a total of 31½ dredging days and excavating 80,200 cubic yards of material. Dredging of the *Gamboa* was confined entirely to the east and west ferry slips from which a total of 49,800 cubic yards were dredged from the former and 37,900 cubic yards from the

latter. The craneboat *Atlas* was engaged on maintenance in the east ferry slip for 6 days during the year removing a total of 700 cubic yards of material. The total maintenance dredging for the year in the Miraflores Lake section amounted to 7,400 cubic yards, all of which was earth. Maintenance dredging in Balboa Harbor was carried on by the dipper dredge *Cascadas* which worked 30½ days and removed 76,800 cubic yards of material, all of which was earth.

SPECIAL MAINTENANCE PROJECTS

Project No. 1.—This project consists of deepening the Pacific entrance channel from Miraflores Locks to the sea buoys, including Balboa Harbor. Additions known as Projects Nos. 1-A and 1-B, Pacific entrance, and Project No. 1-A, Balboa Harbor, have been authorized since the inception in 1924 of Project No. 1. On June 2, 1941, Extensions Nos. 2 and 3, Balboa Harbor, were submitted and approved by the Board on Channel Improvements. The purpose of Extension No. 2 is to provide a basin for a barge repair and tie-up station for Dredging Division use, thereby releasing the space at dock No. 13, Balboa, at which similar facilities have heretofore been provided. The purposes of Extension No. 3 are to provide sufficient space for an additional pier, with slip, north of pier No. 18, and to increase the area available for anchorage. Dredging on Project No. 1-B, Pacific entrance, was in progress for a total of 17½ days during the year by the dipper dredges *Gamboa* and *Cascadas*, resulting in the excavation of 30,000 cubic yards of earth and unmined rock. Subaqueous mining by the drillboat *Terrier No. 2* was in progress 33 days during the year which resulted in the breaking of 17,000 cubic yards of rock. At the end of the fiscal year excavation on the Pacific entrance portion of Project No. 1 was 96.2 percent completed. The dipper dredge *Gamboa* worked a total of 9½ days on Extension No. 2 of this project, excavating 65,500 cubic yards of earth. There was no dredging on Extension No. 3, Balboa Harbor, during the year.

Project No. 13, Gaillard Cut.—This project, begun in 1935, consists of widening Culebra Reach by 200 feet to the westward. Dredging on this project was in progress during the year with the dipper dredges *Cascadas*, *Gamboa*, and *Paraíso*, shore mining with wagon, tripod and jackhammer drill; sluicing operations were performed by *Grader No. 4*. This shore mining, which was in progress for a total of 365 days, resulted in the breaking of a total of 135,600 cubic yards of rock. The operations of *Grader No. 4* resulted in the sluicing into the Canal of 396,400 cubic yards of material, including 173,000 cubic yards of mined rock, 100,600 cubic yards of unmined rock, and 122,800 cubic yards of earth. The dipper dredges were at work on the project for an aggregate of 170½ days, excavating a total of 692,000 cubic yards of material.

THIRD LOCKS DREDGING

The Dredging Division is charged with the performance of practically all of the wet excavation in connection with the construction of the Third Locks project which was officially started on July 1, 1940. This dredging work consists of the following items: New Gatun Locks bypass channels, Atlantic entrance and south approach; New Pedro Miguel Locks bypass channels, north and south approach; and New Miraflores Locks bypass channels, north approach and Pacific entrance. Wet excavation on the New Miraflores Locks bypass channel, Pacific entrance, was inaugurated on the morning of July 1, 1940, by the dipper dredge *Cascadas*, while similar work was begun October 1, 1940, on the New Gatun Locks bypass channel, Atlantic entrance, by the pipe line suction dredge *Las Cruces*. No dredging was performed on any of the other bypass channels during 1941.

New Miraflores Locks bypass channel, Pacific entrance.—Dredging on this project was in progress for a total of 246% days by the dipper dredges *Cascadas* and *Gamboa*. Subaqueous mining was in progress for a total of 189% days by the drillboats *Terrier No. 2* and *Vulcan*. Shore mining with Star Well drills was in progress 99 days. The dipper dredge *Cascadas*, working 222% days in this bypass channel, excavated a total of 1,353,400 cubic yards of material, consisting of 1,100 cubic yards of mined rock, 252,200 cubic yards of unmined rock and 1,100,100 cubic yards of earth. The dipper dredge *Gamboa* worked 24 days in this area during the year, excavating a total of 204,600 cubic yards of material, of which 19,100 cubic yards were unmined rock and 185,500 cubic yards earth. Total excavation to the end of 1941 on the New Miraflores Locks bypass channel, Pacific entrance, is 1,558,000 cubic yards, which represents 11.8 percent of the total to be dredged on this project.

New Gatun Locks bypass channel, Atlantic entrance.—Dredging on this project was in progress for a total of 138% days during the year with the pipe line suction dredge *Las Cruces* and the dipper dredge *Paraíso*. Subaqueous mining by the drillboat *Terrier No. 2* was in progress 59 days, and shore mining with Star Well drills, 118 days. The pipe line suction dredge *Las Cruces* worked 114% days during the year on this bypass channel excavating a total of 1,843,800 cubic yards of material, all of which was earth. The dipper dredge *Paraíso* worked 24 days in this area excavating a total of 129,100 cubic yards, of which 9,400 cubic yards were mined rock, 31,400 cubic yards unmined rock, and 88,300 cubic yards earth. Total excavation to date on the New Gatun Locks bypass channel, Atlantic entrance, is 1,972,900 cubic yards and 26,100 cubic yards of dry excavation from the Mindi River diversion. At the end of the year the excavation on this bypass channel was 20.1 percent completed.

SLIDES

The total excavation from slides in Gaillard Cut for the fiscal year 1941 amounted to 216,000 cubic yards, making the total slide excavation from June 30, 1913, to June 30, 1941, 51,644,300 cubic yards. Slide activity generally throughout the Cut was markedly less than for previous years. Culebra slide (west) and Cucaracha Signal Station slide (west) were the only two slides that developed any noticeable activity during the year. The activity of the Cucaracha Signal Station slide (west) occurred during the month of October and was of very short duration; and that of the Culebra slide (west) occurred during the months of July, August and October. During these months there were accelerated movements all of which were localized in the northern section of the slide and involved small areas; during the other nine months of the year the activity of this slide was confined to a slow, constant movement. Dredges operated in this slide only 2.5 months during the year. There was no interference with shipping on account of slides during the year.

Details of the excavation from slides during the fiscal year 1941, together with the total material excavated from June 30, 1913, to the end of the past fiscal year, are presented in the following table:

Location	Fiscal year 1941			Total to date		
	Earth	Rock	Total	Earth	Rock	Total
	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>	<i>Cubic yards</i>
Hant Obispo slide (east).....	0	0	0	6,700	5,500	12,200
Buena Vista slide (west).....	0	0	0	7,000	1,500	8,500
Buena Vista slide (east).....	0	0	0	12,100	17,550	29,650
Cascadas slide (east).....	0	0	0	9,250	49,900	59,150
White House slide (east).....	0	0	0	30,250	46,050	76,300
White House slide (west).....	0	0	0	21,000	100,550	121,550
Power House slide (west).....	0	0	0	115,250	343,450	458,700
La Pita slide (east).....	0	0	0	12,300	96,700	109,000
La Pita slide (west).....	0	0	0	4,550	42,900	47,450
Empire slide (east).....	0	0	0	40,550	237,950	278,500
Lirio slide (east).....	0	0	0	83,850	161,300	245,150
Division Office slide (west).....	0	0	0	4,150	19,450	23,600
Lirio slide (west).....	0	0	0	570,450	1,987,750	2,558,200
Culebra slide (east).....	0	0	0	2,785,250	18,142,750	20,928,000
Culebra slide (west).....	74,000	136,700	210,700	2,203,000	11,869,350	14,072,350
Culebra slide extension (east).....	0	0	0	455,700	1,027,750	1,483,450
Barce Repair slide.....	0	0	0	219,750	488,150	707,900
Contractor's Hill (north).....	0	0	0	15,600	148,100	163,700
Contractor's Hill (west).....	0	0	0	7,000	31,600	39,500
Cucaracha slide (east).....	0	0	0	2,492,950	6,851,400	9,344,350
Cucaracha Sig. Sta. slide (west).....	2,000	3,300	5,300	38,600	209,300	247,900
South Cucaracha slide (east).....	0	0	0	61,550	131,700	193,250
Cucaracha Village slide (east).....	0	0	0	33,400	77,400	110,800
Paraiso slide (east).....	0	0	0	1,950	7,250	9,200
Cartagena slide (west).....	0	0	0	60,800	265,150	315,950
Total.....	76,000	140,000	216,000	9,293,850	42,350,450	51,644,300

Numerous bank breaks and surface movements occurred during the year at various points throughout Gaillard Cut. Daily inspections and reports were made of all portions of active slide areas fronting the Canal as well as a periodical inspection of the entire surface of all slides. Drainage conditions were investigated and corrected when

possible. Monthly observations were taken of reference points on east and west Culebra, east Culebra extension, Cucaracha, South Cucaracha, and Cartagena slides.

SUBSIDIARY DREDGING DIVISION ACTIVITIES

The Gamboa gravel plant shipped 389,161 cubic yards of sand and gravel during the year, an increase of about 84 percent over the previous year; the normal output is about 50,000 cubic yards. The need for sand and gravel for the many construction projects on the Canal Zone accounts for this great increase in the output of this plant. The pipe line suction dredge *Las Cruces*, together with the necessary auxiliary equipment, was engaged for a total of 119½ days on dredging operations in connection with gravel production. The craneboat *Atlas* produced 125,245 cubic yards of Chame sand during the year which was delivered in barges to Balboa and to the United States Army at Cristobal. Wash drill investigations were carried out in connection with the Third Locks Project aggregates, using two drill rigs between the Gamboa railroad bridge and a point approximately 2 miles up the river for the purpose of determining available supplies of gravel.

The Canal and adjacent waters through Gaillard Cut, Miraflores Lake, and Gatun Lake (including all dump areas) were patrolled and the growth of hyacinths kept under control. Log booms at the mouths of the Chagres and Mandinga Rivers were maintained to prevent hyacinths, logs, floating islands, and other obstructions from entering the Canal channel during freshets or spilling at Madden Dam. During the year, periodical inspection trips were made in the Chagres, Mandinga, Frijoles, and Azules Rivers, and along the shores of Barro Colorado Island, Peña Blanca and Gigante Bays, dumps Nos. 1 to 14, and Miraflores, Pedro Miguel, and Red Tank Lakes. Weekly inspection trips were also made of the Canal channel between Gamboa and Gatun.

It is estimated that 23,383,500 hyacinth plants were destroyed during the year in the following manner: 13,557,000 were sprayed, 5,483,000 were pulled, 4,150,000 were removed by cableway, and 193,500 were burned. In addition, 205 cords of driftwood were picked up along the banks of Gatun Lake, Chagres River, Gaillard Cut, Miraflores, Pedro Miguel, and Red Tank Lakes.

EQUIPMENT

The following dredges and other floating equipment were in operation during the year: The 15-yard dipper dredges *Cascadas*, *Gamboa*, and *Paraiso*, were operated a total of 9 months, 8 months, and 7.5 months, respectively. The 24-inch suction dredge *Las Cruces* was operated for 10.9 months during the year. The craneboat *Atlas* was operated 0.2 months on general maintenance work and, in addition,

spent 4.6 months dredging sand at Chame; the remainder of the year was spent in miscellaneous services of towing, rigging, and pile driving in service of the Dredging Division, Third Locks Project, and various other divisions of the Panama Canal, except for a total of 3.1 months in reserve or under repairs. Derrick barge *No. 157* was operated a total of 8.4 months during the year, and was held in reserve or under repairs 3.6 months. The hydraulic grader *No. 4* was in service for 6.7 months at project No. 13, Gaillard Cut; 3.2 months at Bas Obispo Quarry, Gaillard Cut; and standing by, 2.1 months. The 20-inch relay pump barge *No. 3* was used as an air compressor barge for 3.7 months at project No. 13, Gaillard Cut; 1.9 months at Bas Obispo Quarry, Gaillard Cut; and was standing by 6.4 months at Bas Obispo Quarry. The relay pump barge *No. 24* was out of commission the entire year and held in reserve in Gatun Lake. The drillboat *Terrier No. 2* was in continuous service during the year except for time lost on account of boiler washing operations, general overhaul and minor repairs, totaling 2.1 months. The hull of the new drillboat *Vulcan* was received from the United States on October 21, 1940, and after installation of the machinery by the Mechanical Division, was commissioned on March 17, 1941; the vessel operated the balance of the year, except for $\frac{1}{2}$ day when it underwent minor repairs. The drillboat *Teredo No. 2* was out of commission during the entire year at the barge repair station in Gatun Lake at Gamboa. Air compressor *No. 29* was in service or standing by at project No. 13, Gaillard Cut, 8.3 months, and at Bas Obispo Quarry, Gaillard Cut, 3.7 months; it underwent minor repairs 0.2 month. Excavator *No. 1* was in actual service for 8.9 months; it was engaged 5.8 months on dike construction, excavating drainage ditches and the Mindi River diversion channel for the New Gatun Locks bypass channel, Atlantic entrance; 1.8 months in the Fort Kobbe quarry excavating rock for the west ferry slip breakwater; and 1.3 months constructing dikes and ditches for the New Miraflores Locks bypass channel, Pacific entrance. Excavator *No. 2* was in actual service for 5.5 months, loading at the Gamboa stock pile, excavating material for enlarging the gravel stock pile dike, and for filling and grading the sites for new quarters in Gamboa; this excavator was in reserve 2.3 months and under repair 4.2 months. Excavators *No. 3* and *No. 4* were received and placed in service during the year; the former operated a total of 8.8 months in loading gravel at Gamboa, excavating the new spillway channel for gravel stock pile, excavating for enlarging stock pile dike, excavating for filling and grading the sites for new quarters in Gamboa, and excavating the Mindi River diversion channel for the New Gatun Locks bypass channel; excavator *No. 4*, placed in service January 13, 1941, operated the remainder of the year (except 0.5 month when it was

held in reserve or under minor repairs) excavating for filling and grading sites for new quarters in Gamboa, excavating for enlarging the Gamboa gravel stock pile dike and grading an area for storing washed and screened sand and gravel. The 250-ton floating cranes *Ajax* and *Hercules* were operated throughout the year in miscellaneous services for the various divisions of the Panama Canal and the United States Army. Five large tugs, the *Trinidad*, *Chagres*, *Gatun*, *Empire*, and *La Boca*, supplemented by the *Mariner* and *Bokio* and the three small tugs *Indio*, *Siri*, and *Cocoli* were operated during the year in general towing and transportation service. The Diesel ferry boats *President Roosevelt* and *Presidente Amador* provided a two-ferry schedule throughout the year, with one ferry on three shifts, and one on two shifts operation. Five caterpillar tractors No. 1, No. 2, No. 3, No. 4, and No. 5 were received and placed in service during the year. Other equipment in service during the year included three quarterboats and 30 Star Well drills.

FERRY SERVICES

Thatcher Ferry.—Ferry service across the Pacific entrance of the Canal, connecting Balboa and Panama City on the east bank of the Canal with Thatcher Highway on the west bank, was operated on a continuous 24-hour basis throughout the year. A heavy increase in volume of traffic at Thatcher Ferry was experienced in 1941 over 1940 due to large construction work in progress on the west bank of the Canal. The total number of vehicles carried during the fiscal year 1941 was 76 percent in excess of that of the preceding fiscal year. In the following table are shown the more important statistics relative to operation of the ferry for the past 2 fiscal years:

	1941	1940
Single trips made by the 2 ferries.....	60,933	44,023
Vehicles carried:		
Panama Canal vehicles.....	39,289	24,049
U. S. Army vehicles.....	110,256	69,199
Commercial trucks.....	151,718	42,889
Commercial passenger cars.....	132,016	93,748
Private cars.....	467,073	281,324
Total vehicles carried.....	900,352	511,209
Total passengers carried.....	4,891,812	2,459,311

Miraflores Lake Ferry.—A tug and barge ferry service between the east and west banks of Miraflores Lake was inaugurated on August 12, 1940. Normally the use of this ferry is restricted to Government-owned vehicles or vehicles engaged in the transportation of Government employees in connection with their work. During the year, a total of 14,319 single trips were made and a total of 77,807 vehicles and 395,763 passengers were ferried across the Canal.

MARINE ACTIVITIES

The precautionary measures inaugurated in 1939 regarding rigid inspection of cargoes and the placing of armed guards on board transiting vessels were continued throughout the year. On account of overhaul work in progress at the locks only one of each pair of locks was available for use of transiting vessels during the greater part of the year. The international situation has caused a large decrease in the number of Canal transits, but the limitation of lockage facilities due to the overhaul and the inauguration of a schedule for the lockage of dredge spoil tows has had the effect of lengthening the period of time for transiting vessels from a normal of about 8 hours to about 15 hours.

AIDS TO NAVIGATION

The maintenance of aids to navigation was continued throughout the past fiscal year. Various changes, improvements, and additions to the aids, both lighted and unlighted, have been made during the year.

ACCIDENTS TO SHIPPING

The Board of Local Inspectors investigated and reported on 34 accidents to shipping in Canal Zone waters during the fiscal year 1941, a summary of which follows with a comparison of accidents in the two previous years:

Cause of accident	1941	1940	1939
Ship struck lock wall.....	9	6	7
Ship damaged by tug.....	8	7	6
Ship struck dock.....	4	8	4
Ship struck Canal bank.....	4	3	2
Ship grounded.....	1	2	4
Collision.....	1	1	2
Other causes.....	7	6	2
Total.....	34	33	27

SALVAGE AND TOWING

Panama Canal equipment and personnel rendered assistance to two disabled or distressed ships during the year. Successful salvage operations were conducted on one vessel which had struck the Canal bank in Gaillard Cut, while one vessel which had become disabled in the Pacific Ocean some 900 miles from Balboa, was towed to Balboa anchorage.

METEOROLOGY—HYDROLOGY—SEISMOLOGY

Precipitation.—Rainfall in the Canal Zone for the calendar year 1940 was considerably below normal for all stations, with the deficiency most marked in the Pacific section. The average in the Pacific section was 54.13 inches or 26 percent below normal; in the central section, 84.15 inches or 17 percent below normal; and in the Atlantic section, 113.30 inches or 11 percent below normal. Annual totals at rainfall stations ranged from 48.94 inches at Balboa to 162.90 inches at Porto Bello. April was the month of least rainfall and October of greatest rainfall. The maximum rainfall in 24 consecutive hours recorded at any rainfall station was 7.51 inches at Cristobal on November 10 and 11.

Air Temperature.—The mean air temperatures in the Canal Zone for the calendar year 1940 were abnormally high, being slightly higher than the annual means for any previous year on record. The annual mean at Balboa Heights was 80.0° F., which is 1.3° above the 35-year annual average. Monthly means ranged from 78.4° in November to 81.8° in April. The annual mean at Cristobal was 81.2° F., which is 1.2° above the 33-year annual average. Monthly means ranged from 79.7° in November to 82.6° in May. The means and extremes at various stations for the calendar year 1940 are shown in the following table:

Station	Maximum		Minimum		Annual bi-hourly mean
	°F.	Date	°F.	Date	
Balboa Heights.....	95	June 1	68	Mar. 8	80.0
Madden Dam.....	95	Mar. 22	60	Jan. 27	77.9
Gatun.....	94	Oct. 24	69	Mar. 8	80.0
Cristobal.....	92	May 24	71	Nov. 14	81.2

The absolute maximum and minimum temperatures on record at various stations up to June 30, 1941, are given below:

Station	Length of record (years)	Absolute maximum		Absolute minimum		Annual average
		° F.	Date	° F.	Date	° F.
Balboa Heights.....	35	97	Apr. 7, 1912	63	Jan. 27, 1910	78.7
Madden Dam.....	30	98	Apr. 13, 1920	59	{Feb. 4, 1924 Jan. 30, 1929}	77.2
Gatun.....	30	95	{May 21, 1925 May 4, 1933}	66	Aug. 7, 1912	80.3
Cristobal.....	33	95	{Oct. 18, 1924 May 21, 1925}	66	Dec. 9, 1909	80.0

Winds and humidity.—Monthly mean wind velocities on the Pacific coast during the calendar year 1940 ranged from 4.4 miles per hour in September to 10 miles per hour in February, with a maximum velocity for a 5-minute period of 28 miles per hour from the north on February 21. Monthly mean wind velocities on the Atlantic coast ranged from 5.7 miles per hour in September to 14.2 miles per hour in February, with a 5-minute maximum of 31 miles per hour from the north on February 22. Northwest winds were most frequent along the Pacific coast and north winds along the Atlantic coast. The mean relative humidity for the calendar year 1940 was 81 percent on both coasts. Monthly means on the Pacific coast ranged from 72 percent in March to 89 percent in November. Monthly means on the Atlantic coast ranged from 76 percent in April to 86 percent in November.

Tides.—During the calendar year 1940, the following extreme tidal heights occurred at Balboa, the Pacific terminal of the Canal: Highest high water, 10.8 feet above mean sea level on October 3; lowest low water, 11.5 feet below mean sea level on February 26; and the greatest range between consecutive tides, 21.3 feet on October 3. At Cristobal, the Atlantic terminal of the Canal, the following extremes occurred: Highest high water, 1.35 feet above mean sea level on November 20; lowest low water, 0.81 feet below mean sea level on December 29; and the greatest range between consecutive tides, 1.76 feet on December 1.

Seismology.—There were 288 seismic disturbances recorded at the Balboa Heights seismological station during the calendar year 1940, of which 198 were too slight and indistinct to classify, 28 were definitely of distant origin, and the remaining 62 were of comparatively nearby origin with epicenters distant less than 300 miles. Four of the nearby shocks were of sufficient intensity to be felt by local residents. A total of 144 seismic disturbances were recorded during the 6-month period, January to June 1941, of which 95 were slight and indistinct, 12 were of distant origin, and 37 were of nearby origin with epicenters distant less than 300 miles. Five of the nearby shocks were of sufficient intensity to be felt by local residents. No tremors occurring during the calendar year 1940, or during the period January to June 1941, exceeded Intensity III on the Modified Mercalli Scale, and none caused any damage locally.

New Rainfall Stations Established.—Eight new rainfall stations with automatic mechanical registration were established in the Gatun Lake watershed area during the fiscal year 1941, and one existing station was changed from standard to automatic type.

SECTION II

BUSINESS OPERATIONS

The business enterprises carried forward by the Panama Canal and by the Panama Railroad Co. embrace a number of activities which in the United States would normally be carried on by private initiative. These activities have been developed either to meet the needs and demands of shipping passing through the Canal or to meet the needs of the organization and its force of employees. The business enterprises include those sections which are engaged in the supplying of fuel, provisions, ship chandlery, and repairs to vessels; the sale of foods, clothing, and other essentials to Canal and Railroad employees; the handling of cargo and allied operations; and the operation and management of the Panama Railroad and of the steamship line operating between New York and the Isthmus.

The Canal and the Railroad are separate organizations, but the administration of both organizations is vested in the Governor of the Panama Canal, who is also President of the Panama Railroad Co.

PANAMA CANAL BUSINESS OPERATIONS

Business operations of the Panama Canal are conducted separately from operating activities pertaining directly to the transiting of vessels, and the government of the Canal Zone. The annual appropriation acts for the Panama Canal authorize for expenditure and reinvestment all moneys received from the conduct of auxiliary business activities with the proviso that any net profit derived from such business activities shall annually be covered into the Treasury of the United States.

It is the aim to operate the business activities as a whole on a self-supporting basis and to include as a charge against business operations a fixed capital charge of 3 percent (with some minor variations) as interest on the investment. In the accounting of profits to be covered into the Treasury, the amount representing charges for interest on investment is a part of the net profits covered into the Treasury and is in effect a reimbursement to the United States Treasury for interest paid by it to holders of United States bonds. The investment in business activities totaled \$37,448,541.54 at the beginning of the fiscal year, and \$39,356,359.95 at the end (tables 4 and 5, sec. V). The capital charge for the fiscal year 1941 was \$904,783.10

(table 20, sec. V). The profits of \$1,008,741.70 exceeded this amount by \$103,958.60.

MECHANICAL AND MARINE WORK

The volume of work performed for the Panama Canal, which is the principal source for work in the mechanical division shops, showed a decrease of \$1,355,992 as compared with the preceding fiscal year. The total volume of work for all interests was \$5,245,458, a decrease of \$818,537 as compared with the previous year. These statistical decreases are misleading as they were due to decreases in purchases of fabricated materials from the United States. The actual work performed in the shops was greater instead of less.

The value and class of work done in 1941, and the sources thereof, as compared with the preceding year, are shown in the following table:

Gross revenue—class and source

	Fiscal year 1941	Percent of total	Fiscal year 1940	Percent of total
Class:				
Marine.....	\$2, 120, 423	40. 4	\$1, 547, 773	25. 5
Railroad.....	660, 425	12. 6	461, 876	7. 6
Fabricated stock.....	393, 160	7. 5	211, 571	3. 5
Sundries.....	2, 071, 450	39. 5	3, 842, 775	63. 4
Total.....	5, 245, 458	100. 0	6, 063, 995	100. 0
Origin:				
Panama Canal.....	3, 060, 559	58. 3	4, 416, 551	72. 8
Panama Railroad.....	706, 421	13. 5	490, 982	8. 1
Other United States departments.....	830, 762	15. 8	607, 604	10. 0
Outside interests.....	647, 716	12. 4	548, 858	9. 1
Total.....	5, 245, 458	100. 0	6, 063, 995	100. 0

Operating expenses for the fiscal year totaled \$5,167,282, leaving a net revenue from operations of \$78,176.

The marine work listed above includes construction of new vessels for the Canal and overhaul of vessels for the Canal, the United States Navy, and other departments of the United States Government, as well as merchant ship repairs.

DRYDOCKS

During the year 153 drydockings were made at the Balboa and Cristobal drydocks, further details of which are given below:

Vessels belonging to	Balboa drydock	Cristobal drydock
Panama Canal divisions.....	26	5
U. S. Navy.....	25	28
U. S. Army.....	9	4
Other departments of the U. S. Government.....	1	-----
Panama Railroad Co.....	1	2
Outside interests.....	32	20
Total.....	94	59

The Balboa drydock was unoccupied only 6 days out of the year, while the Cristobal drydock was unoccupied 72 days. In the fiscal year 1940, the Balboa drydock was unoccupied only 8 days and the Cristobal drydock 106 days.

MARINE REPAIR WORK

No outstanding jobs developed during the year on commercial vessels although heavy repairs and voyage repairs were made on a considerable number of vessels. The principal commercial ship repair jobs at the Balboa shops were made on two Diesel-driven motor vessels, each of which had suffered a broken crank shaft. In these cases, it was necessary in order to remove the shafts to dismantle the engines almost completely and to rebuild the engines after the shafts were repaired. At the Cristobal shops general repairs, aggregating \$10,000 each, were made on two small coastwise vessels. Assistance was furnished in making a general examination of the main and auxiliary machinery of the *S. S. Conte Biancamano*, and of arranging the care and preservation of the vessel.

As in past years the Cristobal shops were used as the overhaul yard for all submarines stationed in Canal waters, while, unlike previous years, a constant stream of naval work passed through the Balboa shops. In addition to affording periodical drydocking and extensive general overhaul to all local submarines, minesweepers, yard craft, and district vessels, and to affording voyage repairs to transiting naval vessels, the mechanical division made extensive alterations to various destroyers, and extensively rehabilitated and fitted out the various Naval patrol vessels as fast as they arrived at this station.

The marine equipment of the dredging division and marine division, together with that of other divisions of the Canal and Railroad, was afforded the usual drydocking and general overhauls. The dredges *Paraiso* and *Cascadas*, and the 250-ton floating crane *Ajax*, were the largest drydocking and repair jobs for the dredging division. The machinery purchased for the dredging division's drillboat *Vulcan* was installed and the vessel completed for service. At the Balboa Shops, four standard type launches were built for the marine division and one for the dredging division. Other construction work consisted of one 5,000-barrel oil barge and two wooden scows for the Navy; one standard 1,000-yard dump scow was advanced to a point where it was nearly ready for launching.

At Balboa the Colombian destroyers *Antioquia* and *Caldas*, the Colombian training ship *Cucuta*, and the Ecuadorean cruiser *Presidente Alfaro* were drydocked for general overhauls. The United States Lighthouse tender *Acacia* was given a routine drydocking.

WORK OTHER THAN MARINE WORK

Light and heavy repairs on locomotives and other rolling stock of the Panama Railroad Co. were carried out as needed, but the heavy repairs were greatly reduced because of the purchase of new locomotives. In addition to routine car repairs and to the rehabilitation of stored reserve freight cars, five new refrigerator cars were built during the year and added to the Panama Railroad equipment.

PLANT IMPROVEMENTS

Numerous improvements were carried out through the buildings and grounds of the mechanical division, including the construction of a new switchboard in the wood shop at the Balboa shops, and a Diesel fueling plant for locomotives at the Cristobal roundhouse; a new steel roof was placed on the shops office building at Balboa. A 5-ton electric overhead travelling crane was installed in the forge and pipe shop, Cristobal. Arrangements were made during the year for the acquisition of about \$700,000 worth of machine tools for Balboa and Cristobal shops to replace old tools now in use and to add to present machine tool equipment. While the machine tools are mainly machine shop equipment, they also include machines for the forge shop, pipe shop, boiler shop, and instrument repair shop.

ELECTRICAL INSTALLATION AND REPAIR WORK

The principal activities of the electrical division are as follows: The operation and maintenance of the power system; the operation and maintenance of telephone, telegraph, electric clock, fire alarm, printing telegraph, and railway signal systems; the operation and maintenance of the street lighting system; and the installation and maintenance of such electrical equipment as is required by the Panama Canal and other Government agencies, or by vessels undergoing repairs at the Canal terminals. Following is a comparison of the various expenditures of the electrical division for the past two fiscal years:

Expenditures	1941	1940
Maintenance and operation of power system.....	\$840,682	\$638,400
Construction and maintenance of electric work.....	3,426,523	1,831,477
Maintenance and operation of telephones.....	168,906	135,082
Maintenance and operation of railway signals.....	47,940	41,286
Total.....	4,484,051	2,647,154

Details of the actual construction and maintenance performed for the power system may be found on page 13 of this report, under the general heading of Canal operation, while operating statistics of the telephone system are covered on page 40 under the operation of the

Panama Railroad Co. The total of \$4,484,051 shown above for gross expenditures includes inter-departmental transactions. As an example, maintenance and repairs on the power system are performed by the electrical work unit and, hence, this direct element of expense is included in the expenses of both the power system and the electric work.

PURCHASES AND INSPECTIONS IN THE UNITED STATES

The principal purchases of supplies for the Panama Canal were made through the Washington Office, as heretofore. Branch offices with assistant purchasing agents in charge were continued at New York and San Francisco. The Panama Canal medical section, New York general depot, United States Army, Brooklyn, New York, continued, as heretofore, to make purchases of the principal medical and hospital supplies used by the Panama Canal on the Isthmus.

The assistant purchasing agents at New York and San Francisco and the assistant freight-traffic manager at New Orleans of the United Fruit Company have acted as receiving and forwarding agents for material and supplies delivered at and through their respective ports for transshipment to the Isthmus.

Preliminary inspection was made of materials purchased in the United States for delivery at the Isthmus, constituting the large majority of purchases, and final inspection was made of materials purchased for delivery in the United States. These inspections were made by the force of inspectors in the field under the supervision of the inspecting engineer of the Panama Canal at Washington, assisted by the officers of the Corps of Engineers, United States Army; the Bureau of Standards; the Bureau of Chemistry, Department of Agriculture; the Medical Department, United States Army; and the Bureau of Ships, Navy Department.

The volume of purchases made through the Washington Office of the Panama Canal is indicated by the summary following:

	Fiscal year 1941	Fiscal year 1940	Fiscal year 1939
Number of purchase orders placed.....	16,383	12,463	8,582
Value of orders placed.....	\$35,852,905	\$17,719,486	\$4,543,924
Aggregate of purchases since 1904 made through Washington Office.....	\$296,330,918	\$260,478,013	\$242,758,527
Number of disbursement vouchers prepared.....	21,633	14,842	11,002
Value of above vouchers.....	\$22,360,154	\$14,742,058	\$4,061,710
Number of collection vouchers prepared.....	318	330	316
Value of above vouchers.....	\$829,883	\$242,179	\$164,324
Cash discounts taken.....	\$156,321	\$126,563	\$42,291
Realized from sales of surplus material.....	\$227,678	\$40,912	\$348

STOREHOUSES AND SHIP CHANDLERY

In addition to its main function of requisitioning, storing, and issuing general supplies for the Canal and Railroad (exclusive of the merchandising operations of the commissary division) the Canal Zone storehouses sell ships' chandlery and other supplies to commercial

shipping as well as to units of the United States Army and United States Navy. The following statistics cover the more important operative features of the storehouse during the past 3 years:

	Fiscal year 1941	Fiscal year 1940	Fiscal year 1939
Gross revenues—sales and issues.....	\$24,474,368	\$14,140,657	\$5,399,289
Cost of material, plus operating expenses.....	24,227,094	14,069,445	5,361,776
Net revenues.....	247,274	71,212	37,513
Inventory as of June 30.....	\$5,382,212	\$5,290,310	\$4,642,917
Scrap and obsolete stock on hand, June 30.....	\$23,025	\$18,020	\$15,344
Number of steamship sales.....	2,072	1,931	1,746
Steamship sales value.....	\$76,554	\$67,560	\$45,786
Scrap metal sold in local market..... tons.....	81	96	175
Scrap metal sold for export..... do.....	0	0	0

OBsolete AND UNSERVICEABLE PROPERTY AND EQUIPMENT

During the year disposition was made by sale, or by destruction where the items had no money value, of obsolete or unserviceable property and equipment which had an original value of \$532,642. Replacements were made as necessary.

FUEL OIL, DIESEL OIL, GASOLINE, AND KEROSENE

All deliveries of the products listed above to and from tanks for private companies, as well as for the Panama Canal and the United States Navy, are made through pipe lines and pumping plants of the Panama Canal.

The following table summarizes the operation of the fuel oil handling plants for the past 3 years:

	Fiscal year 1941	Fiscal year 1940	Fiscal year 1939
Fuel and Diesel oil:	<i>Barrels</i>	<i>Barrels</i>	<i>Barrels</i>
Handled at Mount Hope (Atlantic side).....	7,195,492	7,144,984	5,179,455
Handled at Balboa (Pacific side).....	5,761,516	5,347,363	3,858,500
Total barrels handled.....	12,957,008	12,492,347	9,037,955
Received by the Panama Canal.....	511,579	303,845	168,707
Used by the Panama Canal.....	359,150	249,157	203,643
Sold by the Panama Canal.....	54,225	36,337	28,009
Miscellaneous transfers on tank farms.....	39,551	24,004	38,074
Pumped for outside interests.....	11,962,503	11,879,004	8,599,522
Total barrels handled.....	12,957,008	12,492,347	9,037,955
Number of ships discharging or receiving fuel and Diesel oil:			
Panama Canal craft.....	95	165	109
All others.....	2,620	2,290	2,063
Total.....	2,715	2,455	2,172
Gasoline and kerosene:			
Bulk gasoline received—gallons.....	8,286,375	5,534,641	3,736,203
Bulk kerosene received—gallons.....	1,742,921	1,460,682	1,139,617
Financial result of operations:			
Total revenues.....	\$1,009,932	\$821,125	\$617,173
Total expenditures (including cost of sales).....	966,408	777,372	511,376
Net revenues.....	43,524	43,753	105,797

BUILDING CONSTRUCTION AND MAINTENANCE

The past fiscal year has been devoted principally to the construction of quarters for the rapidly increasing personnel brought to the Canal Zone in connection with defense projects and the Third Locks project. Special emphasis has been placed on the building of quarters and other facilities in the new locks towns of Margarita and Cocoli; further construction also was carried forward on the Third Locks headquarters town of Diablo Heights. In addition quarters were constructed in the older towns of Cristobal, Balboa, Gatun, and Gamboa. Maintenance was continued on the existing buildings in use, with minor repairs and replacements being made throughout the year.

The principal projects of building construction completed by the building division during the fiscal year 1941 were as follows:

Cristobal.—Erection of a motor car repair shop, truck shed, ordnance office, cement shed and shop, Fort Davis; 23 buildings for silver family quarters and one building for gold bachelor quarters.

Margarita.—Erection of 18 buildings for gold family quarters and 5 buildings for gold bachelor quarters.

Gatun.—Erection of 6 buildings for gold family quarters, 3 buildings for gold bachelor quarters, 8 barracks for silver laborers, one silver mess hall, and one paint and carpenter shop for Atlantic Locks.

Gamboa.—Erection of 6 buildings for gold family quarters, 3 buildings for gold bachelor quarters, and 8 barracks for silver laborers.

Pedro Miguel.—Erection of 7 buildings for gold family quarters and one building for gold bachelor quarters.

Cocoli.—Erection of 10 buildings for gold family quarters, one building for gold bachelor quarters, and two barracks for silver laborers.

Diablo Heights.—Erection of 62 buildings for gold family quarters, 3 buildings for gold bachelor quarters, commissary, gold elementary school, and office building for special engineering division.

Ancon-Balboa.—Erection of 24 gold family quarters, one building for gold bachelor apartments; silver commissary; annex "E", Gorgas Hospital, and 4 barracks for silver laborers.

In addition to the new construction, expenditures for maintenance and repair work during the past year aggregated \$1,318,361, of which \$460,212 was expended on maintenance of quarters of gold employees and \$161,436 on maintenance of quarters for silver employees; the balance of \$696,713 was spent on all other maintenance work performed by the building division.

The total volume of construction and maintenance work for the past 3 years is summarized below:

	Fiscal year 1941	Fiscal year 1940	Fiscal year 1939
For Canal division:			
Repair and maintenance work.....	\$894, 035	\$643, 499	\$649, 630
Construction work.....	7, 181, 052	4, 090, 527	1, 463, 052
For the Panama Railroad Co.:			
Repair and maintenance work.....	255, 148	94, 375	63, 229
Construction work.....	355, 616	195, 671	5, 540
For other departments of the Government, employees and others.....	308, 793	128, 631	64, 921
Total.....	8, 994, 644	5, 152, 703	2, 216, 372
Total maintenance.....	1, 318, 361	853, 598	777, 779
Total construction.....	7, 676, 283	4, 299, 105	1, 468, 593
Total.....	8, 994, 644	5, 152, 703	2, 216, 372

QUARTERS FOR EMPLOYEES

Gold Employees.—As stated previously, the construction of quarters for gold employees constituted the major activity of the building division in the fiscal year 1941. This program included the construction of 168 new buildings, totaling 851 apartments for family quarters, and 14 bachelor buildings, totaling 440 rooms and 40 bachelor apartments. For the greater part, these were multiple apartment houses of a special type designed to provide small apartments to employees temporarily added to the organization in connection with the design and construction of the Third Locks and other projects.

Even with the heavy building program outlined above, the influx of new employees far exceeded the supply of quarters, especially family accommodations. On June 30, 1941, there were 836 applications on file for family quarters as compared with 650 applications on June 30, 1940.

No changes were made in the general regulations governing the assignments and rental of quarters to American employees.

Silver Employees.—The operation of silver quarters was continued on the same basis as in previous years. Several new barracks were erected for silver male laborers. No family quarters for silver employees on the Third Locks Project will be provided by the Canal. The new construction comprised the following: 4 barracks for 720 silver men at La Boca; 2 barracks for 720 silver men at Cocoli; and 8 barracks for 3,264 silver men at Gatun. In addition to these, 8 other barracks providing accommodations for 2,496 men were under construction at the end of the fiscal year. In Silver City, on the Atlantic side, 23 of the 36 authorized 12-family cantonment buildings were completed. These buildings were authorized to house Panama Canal and Panama Railroad employees formerly residing in tents in Colon after the Colon fire of April 1940. The demand for quarters from

employees on the silver roll is far in excess of the supply. As of June 30, 1941, there were on file 2,593 applications for silver quarters.

More than 65 percent of the operating forces on the silver roll of the Canal and Railroad organizations have been living in the cities of Colon and Panama for the past several years.

REPLACEMENT OF QUARTERS FOR AMERICAN EMPLOYEES

About 14 years ago cost records indicated that the expense of maintaining the oldest frame quarters for American employees had reached the point where replacement was the most economical procedure. A survey showed some of these old quarters were built by the French Canal Company and by the Panama Railroad Co. before the United States acquired the Canal Zone in 1904. There were also in use a large number of construction camp type of frame houses built during the first years of American operations and large numbers of similar houses built prior to 1915. Some of these were reerected houses which had been moved from towns that were abandoned upon completion of construction work. It was realized that their replacement would require an extensive construction program over a period of years. The matter was placed before Congress and the first appropriation for replacement of quarters for American employees was made for the fiscal year ended June 30, 1927.

The first types of quarters designed and built for the permanent force were of concrete. On account of the large first cost of concrete buildings, designs were resorted to of concrete column and first-floor beams with wood frame structure above. After experience in the construction and maintenance of various types of houses, and after giving consideration to original cost, upkeep, etc., the wooden structures supported on concrete beams have been adopted as standard, and are preferred by a majority of the employees.

The program has been carried forward on funds appropriated each year by Congress so that at the end of the fiscal year 1941, replacements for 863 family and 304 bachelor apartments had been constructed.

In recent years the 44- and 40-hour weeks and the increased activities related to national defense have so expanded the regular Canal force that an acute shortage of quarters has resulted. To relieve this shortage it was necessary to retain in service some 221 apartments for which replacements had been constructed and to use all appropriated funds to build additional quarters. Even with this arrangement in effect there were 833 applicants from the regular Canal force awaiting assignment to family quarters as of June 30, 1941. It is now estimated, however, that completion of the 1941 construction plus the funds appropriated in 1942 will enable the Canal to provide accommodations for approximately 34 percent of the 833 regular employees who

had applications on file at the end of the year. Subsequent funds then will be used to improve the less desirable quarters by converting 12-family buildings to 8-family buildings, and to resume the original replacement program.

The following table shows the number of apartments for American employees' quarters which were to be replaced as of June 30, 1926, the replacements by years up through 1941, and the balance of the original program remaining to be replaced after the fiscal year 1941:

Number of apartments for American employees' quarters

[Status of replacement program as of June 30, 1941]

Location	Cristobal, New Cristobal, Colon Beach		Margarita		Gatun		Gamboa		Pedro Miguel		Ancon Balboa		Total	
	Family	Bachelor	Family	Bachelor	Family	Bachelor	Family	Bachelor	Family	Bachelor	Family	Bachelor	Family	Bachelor
Total number to be replaced June 30, 1926.....	347	276			148	23			135	60	468	401	1,068	1760
Replacements:														
1927.....	49												49	
1928.....	80												80	
1929.....	65										10		75	
1930.....	16										30	40	46	40
1931.....	1										70		71	
1932.....	46										25		71	
1933.....	10	100									12		22	100
1934.....	1				15						10		26	
1935.....					50	32					1		51	32
1936.....					57		26	24					83	24
1937.....							37	12					37	12
1938.....							52						52	
1939.....		16			22						29		51	16
1940.....					12		16				21	64	49	64
1941.....	12								16		88		100	16
Total replacements to end of 1941.....	280	116			¹ 156	² 32	³ 131	36	16		296	104	863	304
Remaining to be replaced after 1941.....	19	160	² 48						4	8	172	297	235	456

¹ Reduced from 831 to 760 by chief quartermaster, July 15, 1937, due to less demand for bachelor quarters.

² Quarters built at Margarita will replace quarters at Cristobal.

³ Gatun replacement of old quarters has been accomplished. The additional 8 apartments over the number listed in 1926 are used for increased personnel on account of 40-hour week and increased activities.

⁴ Includes 9 additional bachelor quarters required at Gatun on account of increase in locks force because of 40-hour week.

⁵ Quarters built at Gamboa will replace quarters at Pedro Miguel and in other districts.

MOTOR TRANSPORTATION

The Motor Transportation Division is charged with the operation and maintenance of all motor and animal transportation furnished the departments and divisions of the Panama Canal and Panama Railroad Co. The centralization of all transportation facilities in this division and the requirement that it operate on a self-sustaining basis have been primarily for the purpose of supplying needed transportation at a minimum cost to the Panama Canal and Panama

Railroad Co. Revenues during the past year totaled \$1,382,965 and the expenses \$1,367,707, which left a net revenue of \$15,258. Much heavy hauling in connection with building and highway construction projects was performed during the year.

During the year 226 cars and trucks were purchased, and 32 cars and trucks were retired. At the close of the fiscal year 683 cars and trucks, 13 trailers and 6 motorcycles were on hand.

PANAMA CANAL PRESS

The operations of the Panama Canal press were continued under the same policy as heretofore. The printing plant carries stocks of materials, and prints such forms, stationery, etc., as are required on the Isthmus in connection with the operation of the Panama Canal and Panama Railroad. The following is a summary of the operation of this plant during the past 2 years:

	Fiscal year 1941	Fiscal year 1940
Gross revenues.....	\$388,603	\$300,180
Total output expense (including supplies not processed in the printing plant)....	378,005	275,647
Net revenue.....	10,598	24,533
Inventory on hand, June 30.....	114,737	104,885

REVENUES DERIVED FROM THE RENTAL OF LANDS IN THE CANAL ZONE

Rentals on building sites and oil-tank sites in the Canal Zone totaled \$47,828 for the year, as compared with revenues of \$45,438 for the fiscal year 1940. Rentals of agricultural land in the Canal Zone totaled \$9,721, as compared with \$10,482 for the preceding year. At the close of the fiscal year 925 licenses were in effect, covering 1,794 hectares of agricultural land within the Canal Zone. This is a reduction of 75 in the number of licenses under the previous fiscal year and a reduction in the area held under licenses of 196 hectares. This reduction is largely the result of the policy adopted in May 1935, providing that as a health measure no more licenses for agricultural land would be issued and that holdings under licenses previously granted cannot be sold or transferred.

BUSINESS OPERATIONS UNDER THE PANAMA RAILROAD CO.

The Panama Railroad Co. was incorporated in 1849 under the laws of the State of New York for the purpose of constructing and operating a railroad across the Isthmus. When the concession, rights, and property of the New French Canal Company were purchased in 1904, the stock of the Panama Railroad Co. became the property of the

United States Government. Since the acquisition of the railroad by the United States, its corporate status has been preserved and the railroad has continued to function as a common carrier.

At the beginning of canal construction work, by executive order of the President of the United States, the Panama Railroad Co. was made an adjunct to the Panama Canal. Its operations are supervised by a Board of Directors functioning under the direction of the Secretary of War. As the operations of the railroad complement those of the Canal, the policy has been for the Board of Directors to elect the Governor of the Panama Canal as President of the Panama Railroad Co. Thus, the Governor of the Panama Canal is the administrative head of the Panama Railroad Co. This practice has insured complete coordination of the activities conducted by the two organizations.

As the activities of the railroad company are covered in detail in its annual report, only the major features of operation as they relate to Canal administration are covered in this section.

In addition to the operation of the trans-Isthmian railroad, the business enterprises conducted by the Panama Railroad Co. include the following: A steamship line operating between New York and the Isthmus; the loading, unloading, storage, and transfer of cargo for shipping interests at the terminal ports; the operation of wholesale warehouses, retail stores, and subsidiary manufacturing plants engaged in the supply of food, clothing, and other essential commodities to Governmental agencies, employees, and their families; the operation of coaling plants, hotels, a dairy and a laundry.

Business operations on the Isthmus, carried on by the Panama Railroad Co., yielded net operating income of \$2,645,673 for the fiscal year 1941, as compared with \$2,497,073 for the previous fiscal year, an increase of \$148,600.

TRANS-ISTHMIAN RAILROAD

The railroad line operates between Colon at the Atlantic terminus and Panama City at the Pacific terminus. In addition to these cities, it serves all nearby activities of the Panama Canal. Gross revenues from the operations of the railroad proper (not including subsidiary business activities) during the fiscal year 1941 amounted to \$3,156,782. Revenue freight totaled 1,073,767 tons, as compared with 600,877 tons during 1940, an increase of 472,890 tons. The 10 locomotives and 50 freight cars contracted for in 1940 were received and placed in service during the early months of the fiscal year 1941. In order to handle the increased volume of business, a further order, including 6 locomotives and 80 freight cars, was placed during 1941.

Statistics covering the various features of railroad operations during the past 3 years are presented in the following table:

	1941	1940	1939
Average miles operated, Colon to Panama.....	47.61	47.61	47.61
Gross operating revenue.....	\$3,156,782	\$2,165,938	\$1,601,804
Number of passengers carried:			
First-class.....	232,005	152,909	159,911
Second-class.....	433,357	294,083	207,348
Total.....	665,362	446,992	367,259
Revenue per passenger-train-mile.....	\$5.68	\$4.41	\$4.08
Revenue per freight-train-mile.....	\$11.68	\$14.65	\$12.08
Passenger-train mileage.....	132,677	149,644	132,324
Freight-train mileage.....	228,775	104,751	71,114
Work-train mileage.....	3,134	4,204	6,043
Total train mileage.....	364,586	258,599	209,481
Switch locomotive miles.....	195,069	114,504	106,134

RECEIVING AND FORWARDING AGENCY

This division handles the dock and harbor activities of the Panama Railroad Co. at the two terminals of the Canal. The following statistics summarize operations for the past 3 years:

	1941	1940	1939
Total revenue.....	\$2,999,118	\$2,508,749	\$1,936,016
Cargo handled and transferred.....	<i>Tons</i> 2,390,618	<i>Tons</i> 2,062,020	<i>Tons</i> 1,580,859
Cargo stevedored.....	1,135,280	797,356	615,530
Total.....	3,525,898	2,859,376	2,196,389
Cargo ships handled.....	3,720	4,187	4,898
Banana schooners handled.....	1,211	1,273	1,211
Agency service furnished vessels.....	83	85	89

COALING PLANTS

Gross revenues from coal sales during the past fiscal year amounted to \$782,412, as compared with \$928,024 in 1940. Sales of coal for the fiscal year 1941, were considerably lower than in the previous fiscal year because of the fewer coal-burning vessels calling at the Canal. The following statistics summarize the operations of the coaling plants at Cristobal and Balboa for the past 3 fiscal years:

	1941	1940	1939
Gross revenues.....	\$782,412	\$928,024	\$557,921
Coal sold.....	<i>Tons</i> 87,416	<i>Tons</i> 118,219	<i>Tons</i> 70,487
Coal purchased.....	62,319	148,024	49,199

TELEPHONES AND TELEGRAPHS

The gross revenue from the operation of telephones, electric clocks, and electric printing telegraph machines was \$272,199.

During the year, 1,997 telephones were installed and 1,236 were discontinued or removed, resulting in a net increase of 761 for the year. At the end of the fiscal year there were 50 electric clocks and 28 automatic printing telegraph typewriters in service. Local and long distance telephone calls handled through the automatic exchanges averaged 131,069 calls per day in 1941 as compared with 78,233 calls per day in 1940. This was a daily average of about 30 calls per telephone.

REAL ESTATE OPERATIONS

Real estate operations of the Panama Railroad Co. cover property owned by the company in the cities of Colon and Panama and buildings erected by the company in the Canal Zone. At the close of the fiscal year, 1,609 leases and 14 licenses were in effect covering the use of the Panama Railroad Co. properties in the cities of Panama and Colon. During the year rebuilding by lessees continued in the area of Colon destroyed by fire on April 13, 1940, although construction has been hampered by the shortage of labor and material.

COMMISSARY DIVISION

The primary function of the commissary division of the Panama Railroad Co., is to maintain adequate stocks of food, clothing and household supplies to meet the needs of United States Government personnel and the various United States Government departments on the Isthmus. In carrying out this function the division operates retail stores in each of the Canal Zone towns, and also central wholesale and cold storage plants. Sales are restricted to agencies and personnel of the United States Government, except that ice, cold storage, food, and other essentials may be purchased by commercial steamships transiting the Canal or calling at its terminal ports.

Net sales for the year totaled \$19,755,188, as compared with \$12,291,266 for the previous fiscal year. The value of merchandise on hand June 30, 1941, was \$2,078,106, as compared with \$1,663,740 at the close of the fiscal year 1940. The ratio of sales to inventory indicates a theoretical stock turn-over of approximately once every

6 weeks. The distribution of sales for the past year as compared with the 2 preceding years was as follows:

	1941	1940	1939
U. S. Government (Army and Navy).....	\$5,480,257	\$2,890,768	\$1,450,032
The Panama Canal.....	2,269,830	1,222,434	839,953
The Panama Railroad Co.....	473,511	358,217	262,395
Individuals and companies.....	692,302	351,361	353,048
Commercial ships.....	361,276	297,478	307,342
Employees.....	11,775,824	8,024,283	6,221,731
Gross sales.....	21,053,000	13,144,541	9,434,501
Less discounts, credits, etc.....	1,297,812	853,275	537,184
Net sales.....	19,755,188	12,291,266	8,897,317

PURCHASES

Purchases during the year aggregated \$16,104,298, an increase of \$6,280,095 as compared with the previous year. The following tabulation shows the value of the various classes of materials purchased, as compared with the 2 preceding years:

	1941	1940	1939
Groceries.....	\$4,068,968	\$2,809,511	\$1,893,472
Candy and tobacco.....	619,563	441,293	357,943
Housewares.....	943,995	544,147	365,359
Dry goods.....	1,997,314	1,255,192	911,704
Shoes.....	624,453	372,400	248,127
Cold storage.....	4,225,880	2,057,722	1,188,344
Raw materials.....	1,080,770	680,201	490,288
Cattle and hogs.....	370,457	281,234	220,202
Milk and cream.....	362,687	273,413	236,844
Dairy products.....	1,810,211	1,109,090	645,368
Total.....	16,104,298	9,824,203	6,557,651

HOTELS

The Hotels Tivoli and Washington were operated by the Panama Railroad Co. without change of policy. These hotels are an essential adjunct of the Canal, providing suitable accommodations to foreign visitors, American tourists, visiting Government officials and others.

The gross revenue from hotels was \$579,015, as compared with \$395,126 in 1940, and the number of guest days was 92,321, as compared with 67,006 in 1940.

MINDI DAIRY

The operations of the Mindi Dairy continued as in the previous years. Milk production for the year totaled 513,351 gallons, as compared with 445,656 gallons in the preceding year, an increase of 67,695 gallons. Fresh milk was supplied the Army and Navy units stationed on the Isthmus in addition to employees and units of the Canal and Railroad organizations.

PANAMA LINE

The gross operating revenue for the steamship line for the fiscal year ended June 30, 1941, amounted to \$4,589,667.25, and the gross operating expenses amounted to \$3,592,011.46, resulting in a net profit from operations of \$997,655.79. The operating profit, compared with the fiscal year ended June 30, 1940, of \$114,953.36, shows an increase in the net revenue of \$882,702.43.

For the year ended June 30, 1941, the tonnage carried by the steamship line amounted to 425,719 tons, as compared with 317,141 tons in the previous year.

The steamship line carried freight and passengers for account of the Panama Canal and other departments of the United States at material reductions from tariff rates, which amounted to the important sum of \$1,404,662. Had regular tariff rates been received by the steamship line for such freight and passenger services performed for the Panama Canal and other Government departments, its income would have been increased by \$1,404,662, and its operations for the year would have resulted in a profit of \$2,402,317.79.

SECTION III

ADMINISTRATION

DEPARTMENTS

The organization of the Panama Canal on the Isthmus embraces five principal departments, namely, operation and maintenance, supply, accounting, executive, and health. In addition to this, an office of the Panama Canal is maintained in Washington, D. C. The Panama Railroad Co., a Government-owned corporation conducting business enterprises on the Isthmus, is a distinct unit, yet it is closely affiliated with the Canal organization.

OPERATION AND MAINTENANCE

The department of operation and maintenance embraces functions related to the actual use of the Canal as a waterway, including the dredged channel, locks, dams, aids to navigation, and statistics of navigation, accessory activities such as shops and drydocks, vessel inspection, electrical and water supply, sewer systems, roads and streets, hydrographic observations, surveys and estimates, and miscellaneous construction other than the erection of buildings.

SUPPLY

The supply department is charged with the accumulation, storage, and distribution of materials and supplies for the Panama Canal and Railroad; the maintenance and construction of buildings; the assignment of living quarters to employees and care of grounds; the operation of storehouses, fuel-oil plants, an experiment garden, and a printing plant; the supplying of motor transportation facilities to the various departments and divisions of the Canal and Railroad organizations; and the operation of messes for silver-roll contract labor.

ACCOUNTING

The accounting department is responsible for the correct recording of financial transactions of the Canal and Railroad; the administrative auditing of vouchers covering the receipt and disbursement of funds preliminary to the final audit by the General Accounting Office; cost keeping of the Canal and Railroad; the checking of timekeeping; the

preparation of estimates for appropriations and the allotment of appropriations to the various departments and divisions; and the examination of claims.

EXECUTIVE

The executive department embraces the general office business of the Governor and all administrative activities invested by the Executive order within the authority of the executive secretary. Under this department come the administration of police and fire protection, postal service, customs, shipping-commissioner work, estates, schools, playgrounds, general correspondence, and records for the organization of the Canal and Panama Railroad, personnel records and administration, wage adjustments, information and publicity, relations with Panama, and the operation of clubhouses, restaurants, moving-picture theaters, etc.

HEALTH

The health department has jurisdiction over all matters pertaining to sanitation and public health within the Canal Zone and the cities of Panama and Colon, the operation of hospitals and dispensaries, and the enforcement of quarantine regulations.

PANAMA RAILROAD COMPANY

The operations of the Panama Railroad Co. on the Isthmus are related closely to the work of the Canal. As the Governor of the Panama Canal is President of the Panama Railroad Co., the heads of departments both of the Canal and Railroad organizations report to him. The general administration of the composite organization is centered in the executive office, and the accounting work in the accounting department. The Panama Railroad and the business divisions of the Canal organization are billed for their proper share of the general overhead work.

CHANGES IN ADMINISTRATIVE PERSONNEL

Appointments in official positions during the fiscal year 1941 were as follows:

Brig. Gen. Glen E. Edgerton, United States Army, was appointed Governor of the Panama Canal on July 11, 1940, vice Brig. Gen. Clarence S. Ridley, United States Army, relieved from duty with the Panama Canal.

Lt. Walter H. Price, United States Navy, was appointed assistant to the marine superintendent on July 1, 1940, vice Lt. Comdr. Worthington S. Bitler, United States Navy, relieved from duty with the Panama Canal.

Col. Raymond A. Wheeler, United States Army, was appointed engineer of maintenance on July 11, 1940, vice Brig. Gen. Glen E. Edgerton, United States Army, appointed Governor.

Capt. Stewart A. Manahan, United States Navy, was appointed marine superintendent on July 13, 1940, vice Capt. Thomas A. Symington, United States Navy, relieved from duty with the Panama Canal.

Mr. Elmer P. Haw was appointed chief, real estate section, on August 16, 1940.

Capt. Isaac I. Yates, United States Navy, was appointed superintendent of the mechanical division on September 1, 1940, vice Captain Edmund R. Norton, United States Navy, relieved from duty with the Panama Canal.

Mr. Edwin E. Abbott was appointed designing engineer, special engineering division, on January 6, 1941, vice Mr. Edward S. Randolph, appointed consulting engineer, special engineering division.

Col. James G. Steese, United States Army, was appointed executive assistant to the engineer of maintenance on February 13, 1941.

Mr. Paul A. Bentz was appointed counsel for the Panama Railroad Co. on March 1, 1941.

Mr. Ronald S. Hazel was appointed assistant counsel for the Panama Railroad Co. on March 1, 1941.

Commander Miles P. DuVal, United States Navy, was appointed Captain of the Port, Balboa, on March 5, 1941, vice Commander George T. Howard, United States Navy, relieved from duty with the Panama Canal.

Mr. Cambridge M. Lupfer was designated assistant executive secretary on March 13, 1941.

Mr. A. Lyle Prather was appointed general manager, Panama Railroad Co., on March 16, 1941, vice Mr. Courtenay T. Lindsay, retired.

Mr. Esbon S. MacSparran was appointed receiving and forwarding agent, Panama Railroad Co., on March 20, 1941, vice Mr. A. Lyle Prather, appointed general manager.

Commander Charles E. Coney, United States Navy, was appointed Captain of the Port, Cristobal, on May 28, 1941, vice Commander Nicholas Vytlačil, United States Navy, relieved from duty with the Panama Canal.

Lt. Col. Henry C. Dooling, United States Army, was appointed assistant chief health officer on June 2, 1941, vice Dr. Dalferes P. Curry, retired.

Lt. Col. Arthur R. Gaines was appointed superintendent, Colon Hospital, on June 2, 1941, vice Lieut. Col. Henry Dooling, appointed assistant chief health officer.

CHANGES IN ADMINISTRATIVE ORGANIZATION

Panama Canal Clubhouses.—Effective October 1, 1940, the organization formerly known as the Bureau of clubs and playgrounds was designated the Panama Canal clubhouses. Effective the same date, the playgrounds section of the former bureau of clubs and playgrounds was transferred to the schools division.

Special Engineering Division.—Effective August 15, 1940, the special construction division and the special engineering division were consolidated under the title of the special engineering division. The principal project assigned to the special engineering division is the improvement and enlargement of the Panama Canal, known as the Third Locks Project.

Subsistence Section.—Effective May 1, 1941, the subsistence section of the supply department was organized to provide for the subsistence of contract laborers. Previous to May 1, 1941, this activity was operated as a function of the Panama Canal clubhouses.

Department of Operation and Maintenance.—Effective July 1, 1940, the designation of the section of office engineer was changed to the office engineering division.

Supply Department.—Effective December 1, 1940, the designation of the constructing quartermaster division was changed to the building division, and the title of the constructing quartermaster was changed to general superintendent.

PERSONNEL ADMINISTRATION

The extensive expansion of activities in the Canal Zone required special emphasis on recruitment, both for gold and silver employees during the year. As of June 30, 1941, there were 15,949 applications for employment on the gold roll of the Panama Canal and Railroad organizations, of which 14,706 were from the United States, 1,002 local civilians, 138 from personnel of Army, Navy and Marine Corps, and 103 from Central and South America, exclusive of Panama. There were also 779 applications for transfer from employees holding regular or temporary positions with the Panama Canal, and 306 applications for employment from among the civilian employees of the Army, Navy and Marine Corps. This made a grand total of 17,034 applications on file at the end of the fiscal year as compared with 13,122 for the same period in the preceding year.

EMPLOYEES

The force employed by the Panama Canal and the Panama Railroad Co. is composed of two classes which for local convenience have been designated "gold" and "silver" employees. The terms "gold" employees and "silver" employees originated during the construction

period of the Canal from the practice of paying common laborers and other unskilled or only semi-skilled workers employed in the Tropics in silver coin, while skilled craftsmen and those occupying executive, professional, and similar positions were paid in gold coin, the latter group being recruited largely from the United States. Although all employees are now paid in United States currency, the original terms used to designate the two classes of employees have been retained for convenience. The terms "gold" and "silver" are applied also to quarters, commissary, clubhouse, and other public facilities.

The gold employees—that is, those carried on the gold pay roll—are, with a few exceptions, citizens of the United States and comprise those employees who are engaged in the skilled trades and in the executive, supervisory, professional, subprofessional, clerical, and other positions where education, training, and special qualifications are required. The force of silver employees is composed almost entirely of natives of the Tropics, a considerable number of whom are Panamanians. The force of silver employees is composed principally of laborers, helpers, and semiskilled workers who perform work which does not require the services of specially trained or qualified persons.

Panama Canal employees are divided, therefore, into two general classes, one of which comprises United States citizens, and the other principally native tropical labor. These two classes are carried on separate pay rolls and the conditions of employment applicable to each differ materially. The division of labor between the two classes of employees is a matter of long custom in tropical countries, and Panama Canal practice conforms to this general custom.

GOLD EMPLOYEES

The distribution of the gold personnel on June 4, 1941, and June 5, 1940, is shown in the following tabulation:

	June 4, 1941	June 5, 1940	Increase	Decrease
THE PANAMA CANAL				
Accounting department.....	286	221	65	-----
Dredging division.....	385	235	150	-----
Assistant engineer of maintenance:				
Electrical division.....	392	294	98	-----
Locks division.....	343	329	14	-----
Municipal division.....	1,069	674	395	-----
Office engineer.....	274	191	83	-----
Meteorology.....	12	10	2	-----
Executive department:				
Executive offices.....	298	220	78	-----
Bureau of posts.....	122	95	27	-----
Civil affairs and customs.....	30	27	3	-----
Panama canal clubhouses.....	106	63	43	-----
Collector.....	18	16	2	-----
Fire protection.....	64	49	15	-----
Magistrates' courts.....	6	4	2	-----
Paymaster.....	18	16	2	-----
Police and prisons.....	232	186	46	-----
Schools.....	180	173	7	-----
Fortifications division.....	3	3	-----	-----
Health department.....	479	386	93	-----
Marine division.....	219	216	3	-----

	June 4, 1941	June 5, 1940	Increase	Decrease
THE PANAMA CANAL—continued				
Mechanical division	677	586	91	
Special engineering division	511	180	331	
Supply department:				
Offices, chief quartermaster	27	15	12	
Building division	301	215	86	
District quartermasters	41	31	13	
Experiment garden	12	6	6	
Fuel-oil plant	40	39	1	
Motor car repair shop	78	45	33	
Motor transportation	193	104	89	
Panama canal press	14	14		
Storehouses	85	74	11	
Subsistence	12		12	
Total, the Panama Canal	6,530	4,717	1,813	
PANAMA RAILROAD CO.				
General manager	176	128	48	
Receiving and forwarding agency	152	117	35	
Commissaries	365	270	95	
Dairy farms	6	4	2	
Hotels	22	14	8	
Real estate section	9	8	1	
Total, Panama Railroad	730	541	189	
Total force	7,260	5,258	2,002	

From the above it will be noted that there has been a net increase of 2,002 in the number of gold employees on the rolls of the Panama Canal and the Panama Railroad Co. This is an increase of 38 per cent and, with a few minor exceptions, it may be seen in every unit in the organization. This increase is a direct result of the great volume of construction now being carried forward on national-defense projects. Expansion has been particularly marked in the municipal engineering division and the special engineering division (Third Locks). Large increases also can be noted in other units related to construction, such as the office engineer, dredging division, electrical division, mechanical division, building division, and motor transportation. Because of the general increase in activity it has likewise been necessary to increase the force in numerous other units not actually engaged in construction work such as the accounting department, the executive offices, the health department, and commissaries.

RECRUITING AND TURNOVER OF FORCE—GOLD EMPLOYEES

The following table shows additions to and separations from the gold force in the fiscal year from July 1, 1940, to June 30, 1941. Employments are classified as made in the United States or on the Isthmus, and separations are classified by cause:

Gold force	Operation and maintenance	Executive	Supply	Health	Accounting	Panama Railroad Co.	Total
Employed or reemployed in the United States	1,229	101	146	120	2	145	1,743
Employed or reemployed on the Isthmus	730	310	263	93	50	101	1,547
Total additions	1,959	411	409	213	52	246	3,290
Resigned	646	153	164	79	16	93	1,151
Retired:							
Age	17	3	6	4	2	2	34
Disability	15	6		1	1	5	28
Voluntary	7	1	3	1	2	2	16
Died	15	3	4		2	2	26
Discharged:							
Reduction of force	9						9
Expiration of temporary employment	23	39	4	35	1	3	105
Cause	46	6	12	2		3	69
Other reasons	6	2	2	2	1	1	14
Total separations	784	213	195	124	25	111	1,452

NOTE.—The above figures do not include 208 employments made on a part-time basis and 120 terminations of part-time employees; neither does it include 222 employments of citizens of the United States on the silver roll and 129 terminations of citizens of the United States on the silver roll.

The Panama Canal:	Panama Railroad Co.:	
Additions	Additions	246
Separations	Separations	111
Net additions	Net additions	135

Based on an average aggregate gold force of 6,260 for the year, the 1,452 separations shown above give a turnover of 23.19 percent from all causes as compared with a turnover rate of 10.75 percent for the fiscal year 1940, which was based upon an average of 4,380 employees with 471 separations. The turnover rate when discharges by reason of expiration of temporary employment are excluded is 21.52 percent for the fiscal year 1941 as compared with 9.79 percent for the fiscal year 1940.

The Washington office of the Panama Canal tendered employment on requisition, above the grade of laborer, to 5,762 persons, as against 2,604 in the previous year. A total of 2,023 accepted tenders and were appointed, covering 228 classes of positions. This is an increase of 478 in comparison with the previous fiscal year when 1,545 appointments were made. This gain was occasioned by the increased construction activities being carried out on the Canal Zone. A total of 6,757 persons, including new appointees, employees returning from leave of absence, and members of their families, were provided transportation from the United States to the Isthmus. This is an increase of 1,049 over the previous year. Of those to whom transportation was provided during the past year 6,120 came from New York, 314 from New Orleans, 8 from other Atlantic coast ports, 297 from Pacific coast ports, and 18 by way of air transport service.

WAGE ADJUSTMENTS

The Panama Canal Act provides that compensation for Panama Canal employees fixed thereunder "shall in no instance exceed by more than 25 percent the salary or compensation paid for the same or similar service to persons employed by the Government in continental United States." Except for certain classes of positions for which higher rates are paid in compliance with specific provisions of subsequent legislation, wages and salaries are fixed within the limits prescribed by the language quoted and generally near the maximum authorized.

SILVER EMPLOYEES

The numbers of employees on the silver roll by departments and divisions, as shown on force reports for June 1941 and June 1940, are given in the following tabulation. These summaries cover the number of employees on the specific days on which the force reports were compiled (the first Wednesday of the month), and are believed to be fairly representative for most of the divisions. In some divisions the number of employees at work may change by several hundred within a short time, according to variations in the demand for hourly rated labor. The summary shows only those at work on June 4, 1941, and June 5, 1940.

	June 4, 1941	June 5, 1940	Increase	Decrease
THE PANAMA CANAL				
Accounting department.....	5	3	2	
Dredging division.....	1,902	1,178	724	
Assistant engineer of maintenance:				
Electrical division.....	677	429	248	
Locks division.....	774	773	1	
Municipal division.....	5,800	4,768	1,032	
Office engineer.....	126	70	56	
Meteorology.....	26	27		1
Executive department:				
Executive offices.....	66	54	12	
Bureau of posts.....	25	22	3	
Civil affairs and customs.....	1	1		
Panama canal clubhouses.....	1,202	690	512	
Magistrates' courts.....	3	3		
Paymaster.....	3	2	1	
Police and prisons.....	39	47	2	
Schools.....	152	131	21	
Health department.....	1,304	1,010	294	
Marine division.....	507	506	1	
Mechanical division.....	1,115	1,100	15	
Special engineering division.....	160	147	13	
Supply department:				
Offices, chief quartermaster.....	4		4	
Building division.....	3,578	2,615	963	
District quartermasters.....	517	408	109	
Experiment garden.....	220	157	53	
Fuel oil plant.....	60	60		
Motor-car repair shop.....	107	63	44	
Motor transportation.....	455	262	193	
Panama Canal press.....	136	95	41	
Storehouses.....	533	472	61	
Subsistence.....	422		422	
Total, the Panama Canal.....	19,929	15,103	4,827	1

	June 4, 1941	June 5, 1940	Increase	Decrease
PANAMA RAILROAD CO.				
General manager.....	690	515	175	
Receiving and forwarding agency.....	2,088	1,105	983	
Commissaries.....	2,950	1,852	1,098	
Dairy farm.....	126	124	2	
Hotels.....	208	189	19	
Real estate section.....	3	3		
Total, Panama Railroad Co.....	6,065	3,788	2,277	
Total force.....	25,994	18,891	7,104	1

From the above table it may be seen that there has been a net increase of 7,103, or 38 percent, in the number of silver employees on the rolls of the Panama Canal and Panama Railroad Co. As explained under the heading of gold employees on page 47 of this report this increase is the direct result of the construction activity now being carried forward. The principal increases are in the municipal engineering division, the building division and the dredging division.

SILVER WAGES

Wages of employees on the silver roll bear no direct relationship to wages of corresponding classes of workers in the United States. As these employees are for the most part natives of the Tropics, their wage scales are established at levels based on wages prevailing for tropical labor in the Caribbean area.

SILVER ELIGIBILITY AND EMPLOYMENT PROGRAM

During the fiscal year 1941 there were 20,028 silver applicants for employment regularly scheduled for interview and physically examined, of which 3,985 were rejected for various causes, while 16,043 were made eligible for permanent employment.

The eligibility work of the past year brought the total number of those interviewed and examined under the procedure to 65,916 at the close of the year.

The number of employments verified during the year totaled 52,520 while total terminations verified during the same period were 36,057.

The local supply of native labor required to carry forward the large construction programs now in progress in the Canal Zone is inadequate, which has necessitated the establishment of recruiting stations for laborers in Jamaica, Costa Rica and Colombia. During the year a total of 4,278 workers were recruited from these stations.

REPATRIATIONS

Under an act approved in the fiscal year 1934, an appropriation of \$150,000 was provided by Congress for the purpose of repatriating unemployed West Indians and their families who have rendered at

least 3 years' service with the United States Government or the Panama Railroad Co. on the Isthmus. During the fiscal year 1941 approximately \$1,143 was expended for repatriation of and rehabilitation of 22 former employees, accompanied by 9 members of their families, a total of 31 persons. To date, a grand total of \$55,343 has been expended for the repatriation of 744 former employees accompanied by 673 members of family giving a grand total of 1,417 individuals. The average cost per person for repatriation has been \$39.06 and the average cost per employee, \$74.39.

CASH RELIEF FOR DISABLED EMPLOYEES

Applications for relief under the act of Congress of July 8, 1937, were received during 1941 at an average rate of 12 per month. The original system established during the latter part of the fiscal year 1938 for administering this program remains basically without change. A few minor restrictive regulations have been adopted, however, to insure adherence to the intent of the act in its strictest sense.

The tables below show the disposition of all applications from employees of both the Panama Canal and the Panama Railroad Co. from the inception of this function. The gross and net amounts of the pay rolls are also indicated:

Applications	Panama Canal	Panama Railroad	Total
Applications received to June 30, 1941, inclusive.....	857	274	1,131
Applications approved for payment.....	495	138	633
Applications suspended for various reasons.....	9	6	15
Applicants died before cash relief was approved.....	26	11	37
Applications rejected for various reasons.....	16	7	23
Applications ineligible because of limitation of the Act.....	308	107	415
Applications not complete but in various stages of progress.....	3	5	8
Total.....	857	274	1,131

NOTE.—Removals from the rolls on account of the death or subsequent reemployment of cash relief recipients: Panama Canal, 117; Panama Railroad, 30.

Total and average costs

	Number of cases	Monthly average payment per case	Monthly pay roll as of June 30, 1941
Panama Canal rolls.....	378	\$17.77	\$6,715.50
Panama Railroad rolls.....	108	17.25	1,863.00
Total.....	486	17.61	8,578.50

Expenditures on behalf of the Panama Canal cash-relief program are paid from annual allotments for that purpose, while those of the Panama Railroad Co. constitute a continuation of the former system of granting cash-relief to the superannuated employees of that com-

pany and are made from Panama Railroad funds. At the beginning of the fiscal year 1941 cash-relief payments were being made to 158 former employees of the Panama Railroad Co. Of this number 11 died or were otherwise separated from the roll, leaving a balance of 147 at the end of the fiscal year. These are not included in the statistics above which include only those employees granted cash-relief under the plan now in effect. The expenditure of the Panama Railroad for the payment of cash considerations to both the superannuated employees and those employees who were awarded cash-relief under the act of Congress of July 8, 1937, amounts to \$41,948 for the fiscal year.

EXPERIMENT GARDENS

The Canal Zone plant introduction gardens and experimental station were established in June 1923. The gardens, which include greenhouses, nurseries, and experimental plantings, embrace approximately 125 acres of land, and are devoted to the propagation and cultivation of a wide variety of useful and ornamental plants from all parts of the world, primarily for the purpose of determining their adaptability and value under local soil and climatic conditions for the general propagation on the Isthmus.

With a total of 51,501 plants and nursery items distributed, the volume of business handled was almost twice that of the previous year. Even though seed and plant exchange with foreign countries was somewhat hampered by the war, many interesting seed and plant introductions were received, and an improved system of caring for the newly introduced seeds and plants has been initiated.

During the year several promising varieties of citrus and close citrus relatives were received from the United States Department of Agriculture, Washington, D. C. This collection includes varieties of tangelos which might be expected to yield here. One of the interesting introductions of the year was a package of flint corn seed which was sent from Habana, Cuba. This is the only introduced variety of corn tried here in which the corn is completely covered by the husk. Further selection is being carried on and a limited number of seeds have been distributed to planters in the Republic of Panama for trial.

A schedule was set up for the handling of landscape plans for the United States Army Quartermaster Corps. These plans are so designed to make the best use of plants being grown in the Army nursery.

Originally the experiment gardens were supported by rents from the agricultural land licenses. However, due to a policy of gradually eliminating such licenses in the interest of health and sanitation, the income from that source has materially decreased, and a small appropriation has been made for the partial support of the garden since the fiscal year 1934. The cost of landscape work done in connection with new

construction and for Army and Navy and the Department of Agriculture is reimbursed to the gardens through work requests issued for such work.

CLUBHOUSES

During the construction of the Panama Canal, recreational and welfare activities for Canal employees were conducted by the Y. M. C. A. with the financial support of the United States Government. These activities when carried forward into the permanent organization were placed under the bureau of clubs and playgrounds. Eventually many diversified activities, such as kindergartens, physical education, motion pictures, restaurants, soda fountains, candy and cigar stands, were assigned to that bureau.

Effective October 1, 1940, the supervision of the playgrounds activity which had been operated as a subdivision under the clubs and playgrounds was transferred to the division of schools since this activity is largely concerned with the physical education of the schools, and the organization formerly known as the bureau of clubs and playgrounds was changed to the Panama Canal clubhouses. Under this reorganization the Panama Canal clubhouses are charged with the operation of all activities formerly operated by the clubhouse subdivision of the bureau of clubs and playgrounds. These activities consist of restaurants, soda fountains, newsstands, candy and cigar counters, moving picture theatres, billiard and pool rooms, bowling alleys and swimming pools, in which the patronage is restricted to Government personnel and their families. The clubhouses are self-supporting and no appropriations are required for the activities carried forward.

There were no important changes in the prices or in the general clubhouse management policies during the past fiscal year. Restaurant revenues doubled those of the preceding year because of the great influx of new employees. Gross revenue from merchandise and periodical sales was up 62 percent over the preceding fiscal year, while that realized from the theaters advanced 54 percent.

During the fiscal year three new gold clubhouses were opened at the new towns of Diablo Heights, Cocoli and Margarita. Dining room capacities are being increased in a number of the old clubhouses.

Several of the buildings now used to house the facilities of this organization are very old wooden structures that have already outlasted their economic lives. Some of these originally had been erected in construction towns of the Canal Zone and toward the end of the construction period were dismantled and reerected on their present sites. It was recognized at the time that these facilities were in the nature of a temporary arrangement, but they were satisfactory and their replacement was not advocated because of the more urgent needs of the Canal. Several of these old wooden buildings are now in

badly deteriorated condition and require heavy maintenance expenditures; they are no longer adequate in capacity or condition and they should be replaced without unnecessary delay.

LEGISLATION

Among the laws enacted by the Congress during the fiscal year 1941 which relate to or apply in the Canal Zone, or affect the Panama Canal, and which are of importance or of general interest, are those hereinafter described.

An act approved July 2, 1940, Public No. 711, 76th Congress, authorized the setting aside of Barro Colorado Island in Gatun Lake, to preserve its natural features for scientific study, for providing facilities for such study, and for other purposes.

An act of July 8, 1940, Public No. 729, 76th Congress, provided for defraying the cost of returning to the United States the remains, families, and effects of officers and employees dying in the Canal Zone or elsewhere abroad.

An act of October 10, 1940, Public No. 839, 76th Congress, provided for uniformity of allowances for the transportation of household goods of civilian officers and employees when transferred from one official station to another for permanent duty.

An act of October 21, 1940, Public No. 873, 76th Congress, known as the Sheppard act and effective during the national emergency, empowered the Secretary of War and the Governor to designate employees of the field services of the War Department and of the Panama Canal, respectively, within certain specified classifications, to receive compensation for overtime employment in excess of 40 hours per week at a rate not less than one and one-half times the regular rate.

A joint resolution of May 28, 1941, Public No. 75, 77th Congress, extended to the Canal Zone as well as other dependencies and possessions of the United States the provisions of section 6 of act of July 2, 1940, Public No. 703, 76th Congress, relative to export control, and authorized the President in the interest of National defense to prohibit or curtail the exportation of military equipment or munitions, or machinery, tools, materials or supplies necessary for the manufacture, servicing or operation thereof.

An act of June 3, 1941, Public No. 100, 77th Congress, made the following provisions, effective during the national emergency: (a) Authorized payment for compensation for employment in excess of 40 hours per week at time and one-half, under the regulations of the President, to those per annum employees in the field services of the War Department, the Panama Canal, the Navy Department, and the Coast Guard, whose overtime services are essential to and directly connected with the expeditious performance of the overtime work

upon which the employees enumerated in the act of October 21, 1940, and section 5 (a) of the act of June 28, 1940, are engaged; and (b) provided that employees of the field service of the War Department and the Panama Canal may, during the emergency, be employed during the time they would otherwise be on vacation without deprivation of their vacation pay for the time so worked.

Legislation relating to the Canal Zone, introduced during the fiscal year 1941 and pending in Congress at the end of the year, includes the following:

(a) A bill (H. R. 527) to amend the Canal Zone Code with respect to the trial of joint defendants, the removal of fugitives from justice, and the regulation of criminal procedure in the Canal Zone;

(b) A bill (H. R. 529) to amend the Canal Zone Code so as to permit the filing of mortgages of personal property, rather than their transcription in books kept for that purpose, and to amend the Code provision relative to the taking of vehicles for temporary use or operation so as to vest jurisdiction of first offenses in the Magistrates' Courts rather than in the District Court;

(c) A bill (H. R. 4495) to amend the Canal Zone Code with reference to the offense of returning to the Canal Zone after deportation following service of a sentence of imprisonment in the Canal Zone, and the offense of riding in an improper or unsafe place on labor trains.

Other general legislation considered by the Congress during the year was carefully reviewed and studied for the purpose of determining its effect on the Canal Zone and the Canal-Railroad organization, and appropriate recommendations were made from time to time when the circumstances indicated such action.

CAPITAL ALLOTMENTS, FISCAL YEAR 1942

The capital allotment appropriation for the fiscal year 1941 of \$1,496,000 was discussed in detail in the annual report for the fiscal year 1940. To this appropriation there was added during the year a supplemental appropriation in the amount of \$771,300. Of this amount, \$240,000 was for the construction of additional quarters for American employees not directly connected with the construction programs; \$350,000 was for an additional turbo-generating unit, Madden Dam power plant, required to meet adequately the demands for electric power in the immediate future; \$131,300 covered the cost of a mortuary at Gorgas Hospital, supplanting an undertaking establishment which was too small to meet present needs and at the same time releasing space required for laboratory activities; and \$50,000 was for rebuilding a portion of Gaillard Highway between Corozal and Fort Clayton. This new highway section is installed at a location which is subject to floods during high tides and heavy rains.

The appropriation for 1942 carried \$3,333,100 for improvements and betterments, and for the replacements of worn-out or excessively deteriorated facilities, as follows:

Additions to Colon Hospital.....	\$700, 000
New ferry, and replacement of ferry slips, Balboa.....	700, 000
Quarters for American employees.....	560, 000
Expansion of water system.....	441, 100
Section "A," Balboa High School-Junior College (completion).....	330, 000
Rebuilding pier No. 13, Cristobal.....	204, 000
Storage warehouse for steel and cable, Balboa.....	136, 000
Storehouse building, Miraflores locks.....	130, 000
Improvement of lighthouse depot, Gatun.....	77, 000
Two motor launches for Marine Division.....	36, 000
Ward building, Palo Seco.....	19, 000
Total.....	3, 333, 100

Additions to Colon Hospital.—This appropriation provides for the construction of an additional ward building, a clinic building, and the necessary auxiliary structures such as steam plant and diet kitchen. The addition of these units represents the start of a 3-year program of regrouping and enlarging the medical services to provide sufficient bed capacity to meet the rapidly increasing demand for hospital facilities on the Atlantic side.

New Ferry, and Replacement of Ferry Slips, Balboa.—The appropriation for this project covers the cost of purchasing a new 50-car ferry boat to supplement the two present ferries (which have a maximum capacity of 28 cars each) for the Thatcher ferry service across the Canal at Balboa, and replacing the present ferry slips which are in a deteriorated condition and inadequate for the accommodation of the new ferry boat. This expansion of ferry facilities, which will increase the existing facilities by about 60 percent, is made necessary because of the heavy increase of traffic which has resulted from the opening of new military areas on the west side of the Canal, construction activities connected with the Third Locks project, and the increase in traffic between the capital city of Panama and the interior of the Republic of Panama. In the fiscal year ended June 30, 1941, there were 900,352 vehicles transported by this service as compared with 511,209 in 1940 and 367,306 in 1939.

Quarters for American Employees.—A considerable portion of the existing dwellings for American employees and their families consist of frame structures built prior to 1914 in the early days of American occupation, many of which were transferred from construction camps to their present locations in the permanent townsites. All of these frame quarters held over from construction days have become so deteriorated that they are not only below reasonable standards of family shelter, but the expenditure for repairs which are being made

from year to year necessary to keep them habitable is largely an economic waste.

Expansion of Water System.—This appropriation was made for the continuation of the expansion of the water supply system begun in 1940. This expansion is necessary to relieve the overtaxed facilities of the present system which are now running at capacity limits. With the continuance of new construction activity by the Army and Navy as well as by the Panama Canal, this expansion is an immediate necessity.

Section "A," Balboa High School-Junior College (completion).—Funds appropriated under this item cover the cost of completing the construction of Section "A," Balboa High School and Junior College. The total cost of this building is \$680,000, the work having been started in 1940 when the sum of \$350,000 was appropriated. These new facilities are required because of the large increase in school enrollment due to the expansion of military and civilian population in the Canal Zone.

Rebuilding of Pier No. 13, Cristobal.—Funds appropriated for this item provide for the rebuilding of Pier No. 13, Cristobal, which, upon completion, will be 760 feet by 24 feet, with a foundation of wood piles, a wood deck floor, and tracks for crane service. The existing wooden dock was erected during the construction of the Atlantic terminal and was used as an oil crib until the transfer of this facility to the coaling plant. The dock is now in such poor condition that it has been condemned as unsafe for use.

Storage Warehouse for Steel and Cable, Balboa.—This structure is to be 300 feet by 60 feet, with railroad facilities and overhead crane for proper handling of heavy materials. The new building is required for the storage of reinforcing steel, cable, and other heavy materials which are arriving on the Isthmus in large quantities at the present time. The completion of the new structure will release space in other buildings, particularly the lumber shed, which is needed for the storage of other materials.

Storehouse Building, Miraflores Locks.—The proposed new building is to replace an old structure which was built in 1908 to house a steam power plant but which has been used since 1927 for the storage of spare parts, materials, equipment and supplies necessary for the operation and maintenance of the locks. The building is now in such a bad state of deterioration that it is in danger of collapse and repairs would cost as much as a new building. The new structure is to be 195 feet by 77 feet, with railroad facilities and a 20-ton crane.

Improvement to Lighthouse Depot, Gatun.—This project covers the construction of an addition to the existing dock at the Lighthouse Subdivision depot at Gatun, and is to provide storage space for salvage gear, and parts and equipment for navigational aids; it will also pro-

vide a berth at which to moor the tug *Favorite*, and covered moorings and adequate repair facilities for launches operated by the Subdivision. At the present time, two barges which are very old and in danger of sinking, are used as floating storehouses, while no deep water frontage for mooring is now available at the depot. Without covered or protected berthing space, the launches assigned to this unit must be moored in the open where they are subject to increased deterioration from the weather. In addition, present arrangements do not provide a satisfactory means for effecting repairs.

Two Motor Launches for the Marine Division.—In order properly to maintain normal standards of efficiency and to insure economical operations of Canal business, there has been inaugurated a program of replacement of Marine Division launches as they become obsolete and deteriorated by use. Under this program four of the present launches will have reached the end of their useful lives in 1942 and will have to be replaced. Regular replacement reserves are sufficient to replace only two of the boats; the cost of the other two was covered by appropriation.

Ward Building, Palo Seco.—This ward building is to be a two-story frame structure to house inmates of the leper colony at Palo Seco. The construction of this building is a part of a progressive plan initiated in 1937 for replacing the worn-out buildings at the leper colony.

GENERAL PROGRAM

During each of the past several years the Canal administration has given study to all phases of Canal activities with a view to developing and carrying forward a well considered building and construction program, with advance planning extending some 10 years in the future. These studies have been carried out in order that the more pressing needs of the Canal project in the way of replacements, betterments, and enlarged facilities may be provided for under a carefully considered plan.

The value of adopting and adhering to a definitely planned program of replacements and betterments lies in the fact that it not only facilitates the submission of comprehensive data regarding future needs to the Bureau of the Budget, but also appreciable savings in the purchase of materials, recruiting and employment of personnel frequently result from coordinating the program for replacements and betterments with the regular activities of the Canal organization.

Lists have been prepared of needed additions and replacements over a period of years and approximate estimates have been made of the costs. Obtaining funds for this work is one of the most important problems of the Panama Canal. During the construction of the

Canal inexpensive, temporary wooden structures were built to house the shops and other parts of the construction plant, the employees, and many of the public-utility and governmental functions, and many of these continued to be used in the interest of economy for housing the operating plant and personnel after construction was completed. Because of the destructive effects of the elements and of insects in this region, the economical life of such structures is short. The plan is to replace these short-lived buildings by more durable structures, and at the same time to increase their capacity to meet urgent needs, as rapidly as the necessary funds are obtained. The undertaking is so extensive that many of these old structures are frequently being maintained at excessive cost, and this uneconomical condition will continue and become progressively worse until funds can be obtained for the necessary replacements. The problem of replacement of such structures as can be deferred for five years will be partially solved by the salvage, where practicable, of buildings erected in connection with the Third Locks project which is scheduled for completion in 1946.

THIRD LOCKS PROJECT

WORK TO BE PERFORMED—COST—AUTHORIZATION

The Third Locks project, providing for the improvement and enlargement of the capacity of the Panama Canal in the interest of defense and interoceanic commerce at a cost not to exceed \$277,000,000 was authorized by Act of Congress (Public No. 391, 76th Congress), approved August 11, 1939. The project involves the design and construction of a new set of locks at some distance from the existing locks, the excavation of approach channels to connect the new locks with the existing canal, and the design and construction of appurtenant works.

APPROPRIATIONS—AUTHORITY TO ENTER INTO CONTRACTS

The War Department civil appropriation act for 1941 provided \$15,000,000 for the third locks project and, in addition, empowers the Governor of the Panama Canal, when authorized by the Secretary of War, to enter into contracts prior to July 1, 1941, for or on account of the construction of the project, to an amount not in excess of \$99,000,000. The Governor, on December 27, 1940, requested authority to enter into contractual obligations to the extent of \$8,517,000, and the request was approved by the Secretary of War on January 4, 1941. A request by the Governor on January 20, 1941, for authority to enter into additional contracts to the extent of \$56,200,000 was approved by the Secretary of War, January 30, 1941.

The War Department civil appropriation act for 1942, approved May 23, 1941, provided \$34,932,000 for continued construction of the Third Locks. In addition, it permits the Governor, when authorized by the Secretary of War, to enter into contracts prior to July 1, 1942, to an amount not in excess of \$79,000,000. Pursuant thereto, on June 2, 1941, the Governor requested authority to enter into contracts to the extent of \$79,000,000. The request was approved by the Secretary of War on June 13, 1941.

ORGANIZATION—DUTIES—PERSONNEL

Design and construction of the third locks project are assigned to the special engineering division, which was created August 15, 1940, by consolidation of the former special construction division and special engineering division. The division develops designs and conducts investigations and research relative thereto; prepares plans and specifications for the work; prepares contracts and supervises their prosecution; and plans for, supervises, and coordinates the work of all Panama Canal and contract forces engaged on the third locks project and appurtenant works.

Recruitment of personnel for the project, previously begun, was continuous throughout the fiscal year and at the close of the year gold personnel in the special engineering division numbered 536. Three new towns were developed to provide for Canal and contractors' employees engaged on the project. The new Pacific side towns are Diablo Heights, about two miles north of Balboa Heights, and Cocoli, west of the Canal, and approximately opposite Diablo Heights. On the Atlantic side, Margarita has been built about two and a half miles southeast of Cristobal. Native laborers on the Atlantic side will be housed in a special camp adjacent to the existing town of Gatun. Special Engineering Division headquarters are at Diablo Heights. Each of the new towns is complete with a school, clubhouse, post office, commissary, fire station, dispensary, recreation facilities, etc. Quarters for Canal employees and for the limited use of contractors to facilitate commencement of operations are constructed by the Panama Canal. Contractors are required to construct quarters for use by the majority of their own employees.

DESIGN—PLANS—SPECIFICATIONS

Designs previously begun were vigorously prosecuted and advanced as new personnel arrived and assumed their duties. Subsurface exploration by means of borings, test pits, and tunnels; hydraulic laboratory experimental work; and investigations and studies on all aspects of the lock design were continued. Data previously collected and information from earlier studies permitted the location of the

new locks to be fixed and preliminary designs completed so that, in turn, specifications for excavation of the locks sites could be prepared. The excavation specifications included related appurtenant work, such as grading for highways and railways and excavation of major drainage canals. Plans were developed so that Panama Canal forces were able, early in the year, to begin work on relocations and other appurtenant work. Under contract a new movable, combined highway and railway bridge over the existing Miraflores locks was designed by a private engineering firm, while the east approach viaduct to the bridge was designed by division forces. Specifications were prepared for the bridge substructure and for the superstructure, the former for construction by Panama Canal forces and the latter by contract.

In addition to hydraulic research, tests, investigations, and studies were begun and continued on various types and kinds of equipment and machinery most suitable for use in the new locks. Operating records of the existing locks were examined and qualified authorities consulted for the purpose of developing the optimum lock design. Consulting engineers visited the project on numerous occasions and meetings of the consultants and the third locks designing engineers were held. A materials testing laboratory was established at Miraflores to test concrete and other materials proposed for third locks use and to test samples of material actually used in construction. Also, a special laboratory was established and a series of tests were begun to determine the most effective means of protecting the new locks. Plans were prepared for a mechanical-electrical laboratory wherein special equipment could be tested. By the end of the fiscal year, lock wall dimensions were well-established, gate and machinery studies had eliminated various alternatives, and most of the major design decisions had been made, thus permitting more detailed and specific design to begin for the actual locks construction.

Third locks plans provide for lifts equal in height to that of the existing locks. However, the new locks will be a series of single chambers only, instead of parallel double chambers, as are the existing locks. As a result of the design studies it was determined that the new locks would each be 1,200 feet long, 140 feet wide, and of a depth sufficient to permit the passage of ships having a draft of 45 feet in sea water. The approach guide walls will be symmetrical about the channel center line, 1,500 feet long, and narrowing from 350 feet wide at the open end to 140 feet, the lock width, at the lock entrance.

The new Gatun locks will be approximately 4,000 feet east of the old locks. The over-all length of the three lock chambers and the north and south guide walls will be approximately 7,795 feet. The north approach channel to the new Gatun locks will join the canal just south of Limon Bay and will be approximately 8,100 feet long.

The southerly end of the new Gatun locks guide walls will extend almost to Gatun Lake, and will connect with the lake through a channel 500 feet long. The new Miraflores locks will be between 3,000 and 4,000 feet south of the existing Miraflores locks, and the over-all length of the two chambers and approach guide walls will be 6,490 feet. The Miraflores south approach channel will connect with the existing canal about opposite Balboa Harbor, the channel being 7,250 feet long. A 6,600 foot channel will extend from the upper end of these new locks through Miraflores Lake, connecting with the existing channel in the lake, and continuing to the lower end of the new Pedro Miguel lock. This latter lock will be about 1,800 feet southwesterly of the existing Pedro Miguel lock. Its over-all length, with approach guide walls, will be 5,185 feet and it will connect with the canal through a 7,900 foot north approach channel. The total length of the third locks, including the locks themselves, approach sections, and connecting channels will be approximately 9.4 miles.

As construction of the new Gatun locks will make an island of the site of the present town of Gatun and will sever the main line of the Panama Railroad at two points, appurtenant work includes the relocation of the railroad so that the main line will be continuous east of the new locks site. The road net in the area will also be disrupted by the new locks, and extensive road and highway relocation is necessary in connection with the project. Rail and highway connections to Gatun will be maintained during the construction period by crossing the north land plug separating the "wet" and "dry" land excavation sites. Later a movable bridge will be erected across the new locks to provide permanent rail and highway access to Gatun when the north land plug is removed at the completion of construction.

Railway and highway access to the west side of the existing canal and to the new locks sites on the Pacific side will be provided by a movable bridge constructed across the existing Miraflores locks. As the land at the western terminus of this bridge will become an island upon completion of the new Miraflores locks, a second bridge will eventually be constructed across the new locks to provide continuous access to the mainland west of the canal. On the west Canal shore, the railroad, crossing at Miraflores, will be extended northward to the new Pedro Miguel lock site.

Planning for all phases of locks construction and appurtenant work and preparation of construction schedules were continued throughout the year for the purposes of coordinating current and future work, and in order to arrange for the procurement of supplies, materials, and equipment which would permit a continuous and rapid construction rate. Such planning provides for the furnishing of power and

communications to contractors, the allocation of necessary working areas, the determination of suitable spoil areas, the relocation of all utilities in the new locks areas, the enlargement of existing Canal facilities, and the removal and relocations of numerous buildings, including a large group at Fort Davis.

Studies of possible sources of aggregate supply were made and it was concluded that aggregate for the new locks construction should come mainly from the gravel beds in the Chagres River above Gamboa and be augmented by that from the locks excavation at Miraflores, where hard basalt will be removed. Aggregate requirements were determined and invitations for bids for the processing and loading of Chagres River gravel and for the crushing, processing, and loading of Miraflores rock were prepared and issued July 10, 1941. Cement requirement schedules were developed and invitations for bids for the supply of approximately 6,000,000 barrels of cement were issued June 4, 1941.

CONSTRUCTION

General.—Excavation cost studies indicated that it was desirable to excavate the locks sites, the Gatun south approach channel and Pedro Miguel north approach channel by dry-land methods, and that the Atlantic entrance by-pass channel (Gatun north approach), the Pacific entrance by-pass channel (Miraflores south approach), the North approach to the New Miraflores locks, and the South approach to the Pedro Miguel locks should be excavated by floating equipment. It was determined that dredging equipment owned by the Panama Canal would be augmented with new plant and that the wet excavation of approach channels, and the subsequent removal of the land plugs left in place between the wet and dry excavation sites, would be by Panama Canal forces. Excavation "in the dry" and major heavy appurtenant work, and locks construction would be by contract. Appurtenant work, such as building construction, utility relocation, track laying, etc., for which most necessary plant and working organization were already available, would be done by Panama Canal forces, as the various divisions were familiar with and readily available to carry on this work in a manner which would permit its coordination with the major items, i. e. locks excavation and construction. Excavation and locks construction would be by separate contracts to expedite completion of the project, as excavation could begin on the basis of preliminary design while detailed designs, essential for the construction contract, were continued. Construction plans would be completed and contracts arranged so that construction could begin as soon as part of the locks sites were completely excavated.

At the close of the fiscal year, the excavation plant had been augmented by 4 tugs, 8 dump scows, 30 star well drills, 5 rotary drills, and miscellaneous launches, work boats, etc. A 28-inch suction dredge was on order, and it was planned to buy, in addition, 3 tugs, 16 sand and gravel barges, 75 well drills, and miscellaneous appurtenant plant.

Atlantic Area—Panama Canal Forces.—The Gatun locks site was cleared of jungle growth and some of the buildings in the area were removed by Panama Canal forces prior to the beginning of contract excavation operations. Buildings remaining in the area were later removed by the contractor. Extensive sewer, water and power lines, highways, and communication facilities were relocated so as to clear the locks area but to maintain continuous service to the adjacent areas. The construction by Canal forces of a new stable area, quarter-master area, motor pool, and consolidated gas station at Fort Davis was 99 percent complete at the end of the fiscal year. Laying of track on the railroad relocation was begun just prior to the end of the fiscal year.

Dredging of the channel which will connect the existing canal with the north end of the new locks was begun by Panama Canal forces in October 1940, and on June 30, 1,972,900 cubic yards of material had been dredged from this new channel. Initial dredging was by suction dredge, and the spoil was deposited to raise and level near-by low areas. During June, excavation by dipper dredge was begun and spoil was taken by barge to Gatun Lake and dumped adjacent to the railroad fill opposite Stilson's Pond.

Atlantic Area—Contract Work.—Advertisement for bids for the excavation of new Gatun locks south approach channel and appurtenant work was issued on October 4, 1940. Five bids were offered and when they were opened in Washington, D. C., on December 4, Martin Wunderlich Company and Okes Construction Company were the joint low bidders with a bid of \$8,517,100. The work required under this contract included the excavation of 11,630,000 cubic yards, from the locks sites, 64,000 cubic yards from the drainage canal, and 290,000 cubic yards of grading for the railroad relocation, plus other minor items. A contract was entered into with the low bidders, who actually began excavation of the locks sites on February 19, 1941, prior to the receipt of the official notice to proceed on February 21, 1941. By the end of the fiscal year, the contractor had excavated a total of 2,011,000 cubic yards from the locks site, and was proceeding with other work under the contract. As of June 20, contractor's earnings totalled \$1,447,252.85 equalling 17 percent of the estimated contract cost. Contractor's, including subcontractor's, personnel numbered 279 gold and 176 silver employees. The contractor's

excavation was by means of Diesel shovels and draglines, carrying scrapers and large trucks. Excavated material is used to fill in and level numerous depressions in the vicinity of the town of Gatun. Adjacent to the locks site the contractor established an office, mess hall, and shop, and in Margarita, constructed quarters for the use of his employees. On May 24, Change Order No. 1 to the contract was approved, providing for installation by the contractor of culverts over the railroad and highway relocations. The prime contractor has subcontracted with the Sternberg Dredging Company for the excavation of 2,000,000 yards of material from the north end of the locks site. This excavation is to be by hydraulic dredge, and at the end of the fiscal year the subcontractor had brought to the Canal Zone a 22-inch hydraulic dredge and was engaged in moving it overland to the new locks site where it will begin excavation while floating in an artificially constructed pool.

To improve foundation conditions it was found desirable, late in the fiscal year, to shift the Gatun locks location south, along the center line, 850 feet. At the close of the year, negotiations were under way with the excavation contractor for a change order, which would provide for shifting the locks, and for certain other necessary modifications of the contract. The locks relocation will move the structure nearly to the edge of Gatun Lake and will, in effect, include in the contract the excavation of part of the north approach channel.

Pacific Area—Panama Canal Forces.—The Miraflores and Pedro Miguel locks sites were cleared of jungle growth by Panama Canal forces. Water, power, and communications lines were relocated so as to clear the locks area. Substructure construction for the Miraflores movable bridge and east approach viaduct by Canal forces was 73 percent complete at the end of the year.

Dredging of the channel to connect the south end of the new Miraflores locks with the canal was begun by Canal forces on July 1, 1940, and continued intermittently throughout the year using dipper dredges. The material was loaded into barges and dumped at sea, the amount excavated totaling 1,558,000 cubic yards to June 30. At the close of the year preparations were being made to begin dredging in Miraflores Lake for the north approach to the new Miraflores locks.

Pacific Area—Contract Work.—On January 25, 1941, advertisements of bids were issued for the fabrication and erection of the Miraflores movable bridge and east approach viaduct. Bids were opened in Washington, D. C., on March 12, 1941, and the low bid submitted was \$1,078,840 by the Pittsburgh-Des Moines Steel Company. A contract was entered into with the low bidder, and notice to proceed was issued on April 2, 1941. Assembly of material and equipment and fabrication of the superstructure was continued by the contractor throughout the remainder of the year. On June 20 contractor's

earnings were \$119,775.56, representing 11.1 percent of the estimated contract price.

Advertisements for bids for the excavation of the new Miraflores and Pedro Miguel locks sites, Pedro Miguel north approach channel, and appurtenant works, were issued on February 15, 1941. When bids were opened in Washington, D. C., on April 17, 1941, the lowest of the four bids received was \$22,436,086, submitted by Panama Constructors, Inc. This organization is composed of eight different United States construction firms. Work under this contract included 27,944,000 cubic yards of excavation from the locks sites and north approach channel, 690,000 cubic yards of excavation and grading for the railroad and highway, the crushing and stock piling of 2,150,000 cubic yards of rock for subsequent use as concrete aggregate, the construction of a 250-foot concrete highway and railway bridge across an arm of Miraflores Lake, and other minor related items. A contract was entered into with the low bidder and notice to proceed was issued on May 10, 1941. Subsequent to the signing of the contract, the contractors began to assemble personnel and equipment in the Canal Zone preparatory to beginning excavation. At the close of the year contractor's personnel numbered 63 gold and 62 silver. A large amount of heavy excavation equipment was being assembled and erected adjacent to the locks sites, and quarters for employees, shops, and other utility buildings were under construction.

Summary.—For the locks sites and approach channels, it is estimated that 30,800,000 cubic yards of “dry” excavation and 31,100,000 cubic yards of “wet” excavation, a total of 61,900,000 cubic yards of excavation, will be required. To the end of the fiscal year, locks and approach channel excavation totalled 5,541,900 cubic yards, 3,530,000 yards being “wet” excavation, and 2,011,000 being “dry” excavation.

S. S. PANAMA REQUISITIONED BY MARITIME COMMISSION

On June 7, 1941, the passenger-cargo steamship *Panama*, flagship of the Government-owned Panama Line, which operates a service between New York and the Isthmus, was requisitioned by the Maritime Commission for use in other Government service. With her two sister ships, the *Ancon* and *Cristobal*, weekly service had been maintained in which the 3 vessels operated with capacity loads southbound for the past year. Since about 80 percent of the cargo coming to the Isthmus from the Atlantic seaboard was carried by vessels of the Panama Line, the loss of the *Panama* caused a serious interruption in the flow of materials, food, and supplies urgently needed for national defense and, in addition, produced delays in bringing new employees to the Canal Zone for defense work, as well as regular employees returning from leave.

The situation was solved as effectively as possible for the present when the Line was able to effect a 6-months' charter of a freighter, the S. S. *Jean*, for operation in this vitally important service. The *Jean* is designed for the transportation of some 6,000 to 6,500 tons of general cargo, but there is practically no space available for the transportation of refrigerated cargo. While the *Jean* falls somewhat short of equaling the cargo capacity of the *Panama*, it is hoped the deficiency can be made up by the charter of additional tonnage until such time as a more suitable replacement for the *Panama* can be obtained.

SECTION IV

GOVERNMENT

The civil government of the Canal Zone is conducted as prescribed in the Panama Canal Act of August 24, 1912, and subsequent acts and Executive orders made applicable to the Canal Zone. Whenever practicable, governmental functions have been assigned to departments in the organization established for the operation and maintenance of the Canal. Complete cooperation and increased efficiency are derived from such coordination of functions.

Data on the expenses and revenues of various features of the Canal operation and government are shown in the financial and statistical statement in section V of this report.

AREA OF THE CANAL ZONE

The total area of the Canal Zone,¹ with areas segregated for various purposes, is shown herewith, as of June 30, 1941:

	<i>Square miles</i>
Land area of the Canal Zone.....	362. 01
Water area of the Canal Zone (inclusive of Madden Lake to +260-foot contour).....	190. 94
Total area of the Canal Zone.....	552. 95
<hr/>	
Land areas—military and naval reservations (inclusive of revocable- license area)	
Military reservations.....	74. 76
Naval reservations.....	8. 72
Land areas, Canal Zone town sites and areas in active use (exclusive of of Army and Navy posts).....	14. 18
Barro Colorado Island.....	5. 71
Forest preserve.....	5. 47
Swamps.....	16. 50
Cattle pastures.....	41. 80
Commercial leases .....	. 48
Usable land.....	194. 39
Total land area as above.....	362. 01

POPULATION

A house-to-house canvass of the civil population of the Canal Zone, including employees of the Army and Navy, and members of families of Army and Navy personnel, but omitting the commissioned,

¹ Not inclusive of noncontiguous areas, with the exception of Paitilla Point Military Reservation.

warrant, and enlisted personnel, was made by the police force during the month of June 1941. The following is a summary of the results of the canvass:

	Americans			All others			Total
	Men	Women	Children	Men	Women	Children	
Balboa district.....	4,497	3,804	2,892	5,808	2,821	4,000	23,822
Cristobal district.....	1,780	1,283	1,160	7,627	2,536	3,983	18,369
Prisoners.....	18			134	3		155
Total inhabitants.....	6,295	5,087	4,052	13,569	5,360	7,983	42,346

The total of 42,346 represents an increase of 13,368, or 46 percent, in comparison with the number reported in the house-to-house canvass of June 1939. A complete census of the Canal Zone was taken as of April 1940, as part of the sixteenth decennial census of the United States. Since this census did not segregate civil and military population, no direct comparison can be made with the canvass of the civil population taken in June 1941.

PUBLIC HEALTH

General health conditions in the Canal Zone and in the two terminal cities of Panama and Colon in the Republic of Panama continued satisfactory throughout the year. There were no epidemics of communicable disease.

The increase in the personnel of the Panama Canal, United States Army and Navy, and contractors with the Government has caused a severe strain upon the facilities of the Canal Zone dispensaries and hospitals. A 100-bed annex at Gorgas Hospital has been opened and is now running at full capacity. Aid stations have been developed and maintained in all the areas where extensive construction is in progress. A fully equipped dispensary has been established in the third locks town of Cocoli.

VITAL STATISTICS

The morbidity and mortality rates from diseases and injuries and other vital statistics relating to the populations of the Canal Zone and the cities of Panama and Colon are set forth in detail in the calendar year report of the health department, which is published annually in booklet form. For this reason, most of the tables are omitted from this report, and the data pertaining to vital statistics are limited to a brief résumé of death rates, birth rates, and infant mortality rates.

General Death Rate.—For the Canal Zone in the calendar year 1940 the death rate from all classes remained at about the same level as in the preceding year. There has been but little change in the general birth rate since 1934, when it dropped below 7 per 1,000 for the first time. The death rate is artificially low because employees generally leave the Isthmus after retirement, and because the population includes a large number of relatively young soldiers. For Panama City the rate has shown a gradual decline for the past 5 years averaging 12.79 for the above period. Colon, which prior to 1939 consistently had a slightly higher death rate, has shown a decisive decline in the past 2 years. The death rate in Colon for the past 5 years averaged 13.55 per 1,000 population. Below are shown death rates by yearly periods for the past 5 years:

Death rates per 1,000 population—all causes

	Calendar Year				
	1940	1939	1938	1937	1936
Canal Zone.....	6.43	6.32	5.79	6.24	5.62
Panama City.....	11.50	11.93	12.36	13.72	14.44
Colon.....	11.04	11.67	16.03	14.53	14.60

Birth Rate.—In the Canal Zone the birth rate per 1,000 population is low, as the white population includes a large number of enlisted men in the Army. Also the colored population includes a high proportion of employees in the older age group, as only colored employees with more than the average length of service are able to secure assignment to quarters in the Canal Zone. However, the birth rate in the Canal Zone for the calendar year 1940 was the highest in the past 5 years. The following table shows the birth rates in the Canal Zone and in the terminal cities of Panama and Colon for the past 5 years:

Live birth rate per 1,000 population

	Calendar Year				
	1940	1939	1938	1937	1936
Canal Zone:					
White.....	8.98	7.51	7.96	7.18	6.25
Colored.....	19.24	14.90	14.48	15.88	16.03
Combined.....	12.56	10.76	10.94	11.20	10.91
Panama City.....	28.09	28.54	34.64	33.73	35.46
Colon.....	25.41	25.02	30.46	31.83	31.50

Death Rates Among Children Under 1 Year of Age.—The following table shows the infant mortality rates per 1,000 live births for the past 5 years:

Deaths of infants under 1 year of age per 1,000 live births

	Calendar Year				
	1940	1939	1938	1937	1936
Canal Zone:					
White.....	40	31	5	12	35
Colored.....	69	87	58	97	63
Combined.....	56	65	37	68	54
Panama City.....	94	91	78	95	93
Colon.....	98	77	99	77	89

Principal Causes of Death.—The eight principal causes of death in each of the groups of population were as follows:

Number of deaths and annual rate per 1,000 population, calendar year 1940

Cause of death	Canal Zone		Panama City		Colon	
	Number	Rate per 1,000	Number	Rate per 1,000	Number	Rate per 1,000
Diseases of the arteries.....	39	0.75	56	0.49	39	0.84
Organic diseases of the heart.....	30	.58	98	.86	37	.81
Cancer of various organs.....	23	.44	70	.62	32	.69
Pneumonia.....	18	.35	162	1.43	45	.97
Tuberculosis.....	15	.29	231	2.02	61	1.32
Apoplexy.....	10	.20	53	.47	33	.71
Nephritis (acute and chronic).....	10	.20	75	.66	18	.39
Diarrhea and enteritis.....	5	.10	69	.61	22	.48

MALARIA

The malarial rate among the employees of the Panama Canal and the Panama Railroad Co. showed a slight increase over the rate in the preceding year. While the cycles of rise and fall in the malarial rate do not appear to follow each other within fixed and predictable spans of years, it does seem that there are factors, other than those instituted by man, the nature and extent of which we do not know, that markedly influence the rates from year to year, or over longer periods. One native employee died of malaria in November 1940. In the past 8 years no other report of the death of an employee from that disease has been received and there have been only 7 deaths from malaria among employees in the past 20 years.

The rates for malaria among employees only, for the past 10 years, are shown below:

Calendar year	Rate	Calendar year	Rate
1931.....	19	1936.....	12
1932.....	14	1937.....	12
1933.....	27	1938.....	10
1934.....	16	1939.....	14
1935.....	15	1940.....	17

HOSPITALS

The number of patient-days in Panama Canal hospitals for the past 3 fiscal years has been as follows:

	1941	1940	1939
Gorgas Hospital.....	299,815	211,113	162,172
Corozal Hospital:			
Insane.....	84,796	78,139	72,169
Cripples and chronic medical and surgical cases.....	33,326	35,581	38,059
Colon Hospital.....	42,647	33,543	30,508
Palo Seco leper colony.....	46,103	45,477	43,124
Total.....	506,687	403,853	346,032

QUARANTINE AND IMMIGRATION

Inspection was made of 5,853 vessels and 1,154 airplanes, as compared with 6,292 vessels and 729 airplanes during the preceding year; 59 vessels availed themselves of the "special demand" night boarding service, as compared with 149 last year.

Shipping showed a further decline during the year, and is discussed at length in section I of this report. Airplane activity increased markedly over the past year. The general disturbance in world conditions might lead to the belief that there would be an increase in the number of cases of illness brought in by transportation agencies, but no variation in this respect was noted from previous years and no case of quarantinable disease was encountered during the year.

Yellow fever continued to be endemic in parts of Africa and South America, where it occurs mainly as the jungle type. Due to its proximity in South America, this disease remained a menace and, accordingly, careful inspection of all persons arriving by aircraft was practiced throughout the year. New regulations which call for the spraying of planes and the taking of temperatures of all arriving passengers and crews from suspected areas were inaugurated.

Plague continued to be reported from various parts of the world and, as was the case with yellow fever, cases reported from South America were of particular concern to the Canal. Fumigation of ships and cargoes was continued in accordance with requirements of the regulations.

Cholera was reported mainly from China and India. While a considerable number of ships which had called at ports infected with the disease visited the Canal, distance and the short incubation period were important factors of safety. No case occurred on any vessel visiting the Canal.

Typhus fever was most prevalent in parts of Africa and southeastern Europe, as well as from the countries of Bolivia, Peru, and Chile in South America; many cases occurred also in Spain and Germany.

Smallpox, mainly in endemic form and of mild type, existed in many parts of the world. It was also prevalent in countries of South America, thus requiring constant watchfulness and precaution to prevent its introduction into the Canal Zone.

Immigration activities, in addition to regular and routine procedures, continued to be actively concerned with the problem of refugees from Europe, though to much less extent than last year; the repatriation of a large number of alien employees, imported for work on the defense and construction projects on the Canal, is a major activity of the immigration authorities. The number of detention days for the past fiscal year decreased from the high of 35,670 in fiscal year 1940, but the 20,009 detention days for fiscal year 1941 were slightly more than double the detention days for the fiscal year 1939.

The following is a summary of transactions for the year:

	Fiscal year 1941	Fiscal year 1940	Fiscal year 1939
Vessels inspected and passed	5,853	6,292	6,727
Vessels granted pratique by radio	165	129	321
Total	6,018	6,421	7,048
Crew passed at quarantine	287,640	319,217	369,628
Crew passed by radio	42,873	25,460	126,539
Passengers passed at quarantine	113,834	109,847	130,731
Passengers passed by radio	2,332	1,919	3,018
Total	446,679	456,473	629,916
Airplanes inspected and passed	1,154	729	761
Crews of airplanes inspected and passed	5,021	3,090	3,279
Passengers of airplanes inspected and passed	10,799	6,517	4,643
Total	15,820	9,607	7,922
Vessels detained in quarantine	0	0	0
Crew detained on board ship for quarantine	0	0	0
Immigration cases admitted to station	1,792	1,281	1,015
Number of detention days	20,009	35,670	9,039
Persons held for investigation and released	815	176	640
Persons deported under immigration laws	2,369	1,864	1,339
Supplementary inspection of vessels	4,087	4,053	3,827
Vessels fumigated	42	46	41
Boxcars fumigated	108	148	266
Number of "special demand" night boardings	59	149	65

MUNICIPAL ENGINEERING

Municipal work carried on during the year included the construction and maintenance of roads, streets, sidewalks, and the maintenance and operation of water and sewer systems, and miscellaneous construction jobs.

TESTING LABORATORY

A well equipped laboratory was maintained for the making of chemical and bacteriological analyses of water, chemical analyses of different materials, concrete tests, tests for selection of suitable aggregates

for concrete, tests to determine the suitability of different materials and supplies for Canal uses, the issuance of permits for work in the holds of ships and oil tanks, soil and permeability tests, etc.

During the year the testing laboratory carried on a variety of work, making a total of 15,308 tests in connection with 10,802 varied samples. This included 3,245 tests on water and 8,252 on concrete for various purposes. Other tests were made on building materials, clay, gas, oils, various metal, etc., while inspections were made of swimming pools, ships, etc.

WATER SYSTEM

Consumption of water for municipal uses during the past 3 fiscal years has been as follows:

	1941	1940	1939
	<i>Gallons</i>	<i>Gallons</i>	<i>Gallons</i>
Canal Zone.....	4,696,732,000	3,468,961,223	3,179,459,500
City of Panama.....	2,133,841,000	1,899,779,000	1,761,706,000
City of Colon.....	970,076,000	892,972,000	811,639,000
Sales to vessels.....	208,407,000	173,681,627	177,628,840
Total.....	8,009,056,000	6,437,393,850	5,930,433,340

The following statement shows the quantity of water pumped at each of the pumping stations during the year, the average per month, and the cost of pumping per thousand gallons:

	Total gallons pumped during year	Average gallons per month	Average cost per 1,000 gallons for pumping
Gamboa (intake).....	3,130,040,000	260,837,000	\$0.0152
Miraflores (relay).....	939,389,000	78,282,000	.0172
Balboa (relay).....	3,590,330,000	299,194,000	.0131
Paraiso (intake).....	1,896,245,000	158,020,000	.0759
Paraiso (relay).....	126,586,000	10,549,000	.0374
Miraflores Lake (intake).....	11,022,000	919,000	.0083
Mount Hope (intake).....	2,441,611,000	203,468,000	.0165
Agua Clara (intake).....	628,622,000	52,385,000	.0477
Monte Lirio (intake).....	593,600	49,000	1.6071
Frijoles (intake).....	4,837,000	403,000	.2723
Total.....	12,769,275,000	1,064,106,000	-----

Omitting the water which was repumped from the total listed above, 8,112,970,000 gallons of raw water, an average of more than 22,227,000 gallons a day, were pumped by the municipal water system during the past year. All pumps are electrically driven, except those at Frijoles and Monte Lirio, which are driven by gasoline engines.

The usual maintenance work was performed on the pipe lines, reservoirs, filtration plants, and pumping stations during the year. In addition, regular maintenance work was performed on a number of special projects.

During the fiscal year 1941, a large-scale program for expanding and improving the water systems on the Canal Zone was launched. This program, designed to extend over a period of 3 years, involves an approximate total expenditure of \$3,675,000, such expenditure to be jointly financed by the Panama Canal, the Army, and the Navy. Due to the great increase in the Army and Navy garrisons, and to the expansion of Panama Canal activities, including the third locks and special-defense projects, it has been necessary to enlarge the water system on the Pacific end of the Canal from a rated capacity of approximately 15,500,000 gallons per day, to 23,000,000 gallons per day, and to increase the output of the water system on the Atlantic side from its total rated capacity of 10,500,000 gallons per day to 14,500,000 gallons per day. This 3-year program involves the installation of new pipe lines, construction of new pump stations, revision and enlargement of present pump stations and filtration plants, and construction of additional storage facilities for filtered water. At the close of the fiscal year 1941, it was estimated that the work was approximately 2 months behind schedule, attributable to delay in the delivery of materials and equipment from the United States.

SEWER SYSTEM

In addition to the regular maintenance work performed on the sewer system, the following special work was accomplished: Drainage improvement at the old Corozal Road; enclosure of an open drainage ditch on Frangipani Street, Ancon; and the extension of the main sewers serving Colon and New Cristobal, by extending the disposal pipe approximately 1,500 feet into deep water. Plans were made during the year to divert the sewage discharged into the bay in the vicinity of the Washington Hotel into a central sewer sump and pump the collected sewage into one outlet in deep water.

ROADS, STREETS, AND SIDEWALKS

In addition to maintenance work performed on roads, streets, and sidewalks in the Canal Zone, many special projects were carried out during the year. These included: Relocation of Gaillard Highway at Fort Clayton; placing of pavement on relocation of Bolivar Highway, Fort Davis; rebuilding of Gaillard Highway between Corozal and Fort Clayton; widening of Roosevelt Avenue, Balboa, from main entrance of Mechanical Division to La Boca; widening and improving Tivoli crossing and approach streets, Ancon; construction of an 18-foot oiled macadam road to the new garbage dump, Mount Hope (to be completed in 1942); construction of sidewalk from Tivoli crossing, Ancon, to Corozo Street, Balboa, paralleling Gaillard Highway; repairing of Bruja Road between Naval ammunition depot and Pedro

Miguel; construction of sidewalks from terminal building, Balboa, to Diablo crossing, paralleling Diablo Road; construction of new road to serve Miraflores ferry; construction of turn-around road at Ferry entrance, Thatcher Highway, west side; and construction of east section of proposed express highway between Ancon and Balboa.

TOWN-SITE DEVELOPMENT

Due to continued increase in the Canal Zone population, the development of areas for building sites started during the preceding year was continued on a greatly expanded scale. The municipal engineering division work consisted of grading, construction of roads, streets, and sidewalks, installation of water and sewer systems, and drainage. The following principal areas and sites were developed: Diablo Heights, new construction town and headquarters for construction of the Third Locks; Cocoli gold town site; Cocoli silver town site; and Margarita gold town site (all new Third Locks towns); municipal work also was performed at sites of new developments located in Ancon, Balboa, Gamboa, Pedro Miguel, Gatun, Silver City, Gatun silver camp and Camp Bierd (silver).

MIRAFLORES BRIDGE PROJECT

Work was started during the year on a bridge over the existing Miraflores locks, and across the valley of the Rio Grande between the existing Miraflores locks and the main line of the Panama Railroad. This bridge is a part of the Third Locks project. Of this bridge project the municipal engineering division has been charged with the construction of the substructure and the concrete floor slabs on the approach spans. This work involves the manufacture and driving of concrete piles, the construction of caps and pedestals for the footings of all the piers and construction of abutments, for the operators' houses, pivot piers and rest piers for the two swing spans of the bridge. Construction of the piers in the Rio Grande required the use of sheet steel pile cofferdams. At the end of the fiscal year the east approach fill and water pipe culvert under the fill had been completed. Twenty of the 28 piers had been completed, the two pivot pier excavations were practically completed, and concreting of the west pivot pier was complete to elevation -5.6 feet. The entire substructure work was estimated to be 73 percent completed as of June 30, 1941.

RELOCATION OF BUILDINGS AND OTHER FACILITIES AT FORT DAVIS

Considerable work was performed during the year on the removal of buildings from the New Gatun locks construction area and the re-

building and rerouting of streets, water lines, and sewers from the section involved. The largest of the projects was the removal of the Fort Davis stable, motor pool, and quartermaster area to a new location and performing the required grading of the new site, paving streets, building a complete storm and sanitary sewer system, including a pump station and sump for the latter.

CITIES OF PANAMA AND COLON

Regular maintenance work was performed on the water and sewer systems and the streets during the year. Among the more important special projects in progress in 1941 were the widening and repaving the entire length of Thirteenth Street, Panama; the purchase and installation of three pumps in the Colon sewage pumping station; and the installation of sewer lines in the area in Panama City known as Sitio de Marquez.

MISCELLANEOUS PROJECTS

Sosa Hill quarry and rock crushing plant.—A total of 195,816 cubic yards of rock was crushed during the fiscal year and sold to the various departments and divisions of the Panama Canal, Panama Railroad, United States Army and Navy, contractors and individuals. The demand for crushed rock became so great during the year that authorization was given to purchase a 36-inch-42-inch Primary Jaw Crusher to be used in conjunction with the present plant which was completed in May 1940. This plant also has an efficient set-up for producing rock asphalt for resurfacing old roads and construction of new roads and driveways. This rock asphalt has been used extensively in constructing roads and streets for all of the new townsite developments. During the year 10,094 tons of this rock asphalt were produced and sold.

Concrete pipe plant.—A plant was operated during the year for the manufacture of concrete pipe. During the year there were produced 4,254 feet of 20-inch pipe; 10,557 feet of 24-inch pipe; 3,480 feet of 30-inch pipe; and 2,601 feet of 36-inch pipe. The plant also manufactured 15,519 feet of reinforced concrete 14-inch half-section drain tile. This product is mostly used by the municipal engineering division, but a considerable quantity is sold to other branches of the United States Government, and to local contractors.

PUBLIC ORDER

During the fiscal year 7,647 persons were placed under arrest by the Canal Zone police, an increase of 3,670, or 92 percent, in comparison with the previous year, when 3,977 arrests had been made.

Statistics covering these arrests, with corresponding arrests for the previous year, are covered in the following table:

	1941	1940
	<i>Persons</i>	<i>Persons</i>
Male.....	7,348	3,776
Female.....	299	201
Total.....	7,647	3,977
Arrests made with warrants.....	798	301
Arrests made without warrants.....	6,849	3,676
Total.....	7,647	3,977
Residents of the Canal Zone.....	2,798	1,155
Residents of Panama.....	4,249	2,316
Transients.....	600	506
Total.....	7,647	3,977

There were 8,199 charges filed against persons arrested during the fiscal year, of which 8,040 were misdemeanors and 159 were felonies, the latter being 1.9 percent of the total offenses charged. Following were the principal causes of arrest:

Cause of arrest	1941	1940	Cause of arrest	1941	1940
Violation of vehicle traffic regulations.....	4,723	2,179	Petit larceny.....	296	162
Violation of immigration regulations.....	551	422	Intoxication.....	276	94
Disturbing the peace.....	396	186	Fugitive from justice.....	208	149
Loitering.....	331	229	Disorderly conduct.....	173	143
Battery.....	331	185	All others.....	914	575
			Total.....	8,199	4,324

The persons arrested included nationals from 72 countries and territories and comprised 178 different trades and professions. Eight cases of homicides were investigated by the Coroner during the year, seven of which were the result of automobile traffic accidents. In these cases all of the offenders, who were brought to trial on the charge of "involuntary manslaughter", were found guilty and varying sentences and fines were imposed. One defendant was tried on three charges and sentenced to serve one year in the Canal Zone penitentiary on each charge; however, the execution of the sentence was suspended on the second and third charges, and the offender placed on probation for 3 years.

During the year the Coroner investigated four cases of suicide as compared with five in the previous year. Of these suicides, one was due to asphyxia by strangulation, two by poison, and one by use of a cutting instrument. Coroner's investigations were made in 106 cases of death during the year. Twenty-six of these deaths were due to motor vehicle accident injuries, 27 to natural causes and 19 to accidental drowning.

A daily average of 82 prisoners served sentences in the common jails of the Canal Zone during the year, and all those physically able were employed on maintenance of trails, road repairs, and other municipal improvements; others were employed in janitor and miscellaneous work at police and fire stations and at target ranges. The total value of such common-jail labor for the year was \$26,076.96.

Fifty-two convicts were committed to the Canal Zone penitentiary during the year, an increase of 15 in comparison with the preceding year, with aggregate sentences of 69 years and 8 months. Forty-nine convicts were discharged. At the close of the year 70 convicts remained in custody, as compared with 67 at the end of the preceding fiscal year. The convicts were employed during the year on road and municipal work; improving and clearing penitentiary grounds; maintenance of prison buildings; manufacture and repair of prison clothing; and the cultivation of fruits and vegetables, etc., at the penitentiary farm. Labor performed by convicts was valued at \$30,706.10. The total value of fruits, vegetables, and other products of the penitentiary farm amounted to \$7,408.80 as compared with \$6,662.87 in the previous year.

During the year 56 persons were deported from the Canal Zone by order of the Governor. Of this number 30 were convicts who had served sentences in the penitentiary and 26 were persons who had been convicted of misdemeanor charges or who were otherwise deemed undesirable persons to be permitted to remain in the Canal Zone.

There were 960 traffic accidents, an average of 80 per month, reported during the year, as compared with 568 traffic accidents, a monthly average of 47.33, in the previous year. These accidents resulted in the deaths of 26 persons and injuries to 366 persons, of whom 97 were pedestrians. The large increase in the number of traffic accidents is a reflection of the great gain in the number of motor vehicle registrations which exceeded those of last year by 38 percent, and represented the greatest number of any year to date.

Following is a classification of the cause of these accidents for the years 1941 and 1940:

Cause	1941	1940	Cause	1941	1940
Negligent driving.....	401	205	Intoxicated driver.....	37	14
Reckless driving.....	359	257	Inexperienced driver.....	11	24
Careless pedestrian.....	62	29	All other.....	47	18
Defective vehicles.....	43	21	Total.....	960	568

The harbors of Balboa and Cristobal, the Chagres River, and the Canal in the vicinity of Gamboa, Gatun Lake, and the Madden Dam Lake area were patrolled throughout the year, principally for the enforcement of the navigation laws and regulations. During this period

motor launch patrol officers arrested 7 persons for violation of the navigation regulations. During the course of the year police officers on monthly patrols of the interior or rural sections of the Canal Zone made 12 arrests, of which 7 were on charges of trespassing, 3 of petit larceny, 1 of malicious mischief, and 1 of second-degree burglary.

Detectives effected 386 arrests, and made 832 investigations to obtain information in criminal cases; in addition, inquiries were made in 560 cases involving lost property and other matters not involving violation of law.

FIRE PROTECTION

During the year 205 fires, 27 false alarms, and 8 emergency calls were reported. The following table lists the owner on whose property these fires occurred and the extent of losses suffered, together with a comparison with the fires occurring in the previous year:

	1941		1940	
	Number of fires	Property loss	Number of fires	Property loss
Panama Canal.....	153	\$23,960	95	\$2,804
Panama Railroad Co.....	9	107	12	288
U. S. Army.....	7	25,135	4	42
U. S. Navy.....	3		1	
Private.....	33	15,558	29	212,453
Total.....	205	64,760	141	215,587
Total property involved.....	\$3,144,269		\$2,174,286	

MAGISTRATES' COURTS

BALBOA

In the magistrate's court for the subdivision of Balboa, 43 civil and 4,308 criminal cases were handled, whereas a total of 2,382 were handled during the previous year. In the criminal cases, 3,748 resulted in conviction, 312 in acquittal, 108 were dismissed and 140 were held for the district court. In 236 cases, imposition or execution of sentence was suspended and the defendants were placed on probation. Of this group 12 were rearrested for violating the terms of probation and were returned to serve the sentence originally imposed. The increase in cases handled—83 percent—is attributed to the gain in personnel of the Panama Canal and the Army and Navy organizations during the year. Total revenues collected were \$24,193.90.

CRISTOBAL

In the magistrate's court for the subdivision of Cristobal, 11 civil and 3,063 criminal cases were handled, whereas a total of 1,311 cases were handled in the previous year. In the criminal cases, 2,788

resulted in conviction, 131 in acquittal, 38 were dismissed, and 101 were held for the district court. In 76 cases, imposition or execution of sentence was suspended and the defendants were placed on probation. Of this group 6 were rearrested for violating the terms of probation and were returned to serve the sentence originally imposed. The increase over the previous year in cases handled, amounting to approximately 134 percent, is attributed to the increase in personnel of the Panama Canal and the Army and Navy organizations during the year.

PARDONS AND REPRIEVES

The pardon board, consisting of 5 members, is appointed by the Governor and acts in an advisory capacity. During the year, 26 applications for executive clemency were considered by the pardon board. On the board's recommendation, the Governor extended clemency in 8 cases.

Two vacancies in the membership of the pardon board occurred during the year because of the retirement from the service of Doctor D. P. Curry and Mr. R. H. Luce. One of these vacancies was filled by the appointment of Mr. E. A. Erbe, and the other had not been filled at the end of the year.

PUBLIC SCHOOL SYSTEM

Except for the fact that the Canal Zone schools are situated in the various towns rather than in sections of a city, the school organization is comparable with the usual city school system in the United States, having a superintendent with assistants in general charge and a principal for each school.

It has been the practice for a number of years to make comparison of enrollment from 1 year to the next on the basis of the number attending school at the end of February, as February is usually the peak month. The total number of regular pupils enrolled in February of the past fiscal year in both white and colored schools was 7,213, which is an increase of 860, or 13.5 percent, in comparison with the February enrollment of the previous year. In the white schools the regular enrollment (grade one through junior college) advanced from 3,453 to 4,286, an increase of 833, or 24.1 percent. There were 2,927 pupils enrolled in the colored schools in 1941 as against 2,900 in the previous year, a gain of 27.

The greatest percentage of gain in the white schools occurred in elementary and junior high grades. In order to care for the increased grade enrollment, a new elementary school was opened at Diablo Heights in September.

Kindergarten figures are not included in the total enrollment statistics. The kindergartens for white children, formerly adminis-

tered by the bureau of clubs and playgrounds, were transferred during the year to the division of schools. Two hundred and one children between the ages of 5 and 6 were enrolled in the kindergartens (February statistics).

Free school privileges are granted to children of silver employees of the Panama Canal and Panama Railroad Co., only when such employees reside in the Canal Zone. The peak year for enrollment in the colored schools was 1932, when the number was 4,149. From that year the enrollment decreased steadily until 1940 when there were 2,900 in attendance.

For the past 5 years the average daily attendance has been as follows:

	1941	1940	1939	1938	1937
White schools.....	3,296	2,798	2,686	2,765	2,755
Colored schools.....	2,725	2,686	2,818	2,881	3,091
Total.....	6,021	5,484	5,504	5,646	5,846

The above does not include the enrollment in the Canal Zone junior college.

The enrollment in the junior college in September 1940, numbering 171 regular and special students, was the highest enrollment in the college since its establishment 8 years ago. The junior college extension courses which have been designed for adult education had an enrollment of 690 which was more than double that of the preceding year. A total of 22 extension courses was offered in the fields of accounting, business English, shorthand, typewriting, Spanish, mathematics and industrial lubrication. The extension program for adult education has become a vital part of the educational services offered the community by the Canal Zone junior college.

During the past year careful surveys were made of the plans for the expected increase in population of the Canal Zone, both in military forces and in civilian forces engaged in construction activities. The school administration keeps informed as to the anticipated changes and rearranges the plans for the expansion of educational facilities in accordance with such changes. In keeping with the policy of educational preparedness, schools are being built concurrently with the construction of family quarters in various centers of expansion on the Zone. No difficulties are anticipated in the accommodation of the increased school enrollment, and no curtailment of the educational opportunities for children is planned. At present, elementary schools are in process of construction at Cocoli and Margarita, and a new high school and junior college unit is being built in Balboa. Three schools are projected for grades one through eight at Howard Field, Albrook Field and Coco Solo.

On October 1, 1940, the playgrounds and kindergarten activities were reorganized and the administrative supervision of same was transferred from the bureau of clubs and playgrounds (now Panama Canal clubhouses) to the division of schools. This section, which is maintained by appropriated funds, provides facilities for outdoor recreation and promotes and supervises such activities as physical education, kindergartens, playground activities, baseball, basketball, handball, football, tennis, boxing, fencing, archery, athletic meets, etc. The transfer of supervision of this unit to the division of schools was deemed advisable because a large part of the activities are closely allied to the physical program of the schools which has education for its exclusive purpose; kindergarten work also is a natural part of the school program.

The appropriation for playground activities covers the salaries of physical directors and directresses, kindergarten teachers, and playground attendants, and also provides funds for the maintenance of playgrounds, playsheds, baseball and softball diamonds, tennis courts, running tracks, and similar facilities, and for the purchase of playground and physical education equipment. Some of the recreational activities are partially self-supporting, but they cannot be made wholly so without greatly curtailing their scope and thus lessening the benefits now being derived through their extensive use.

The physical instructors and other personnel employed in the Playground Section have charge of the physical education program of the students enrolled in the Canal Zone schools; conduct kindergartens for children of Government employees; and furnish active leadership and guidance to such organizations as the Boy Scouts, Girl Scouts, Sea Scouts, etc.

The recreational facilities provided by the playground section are used extensively, not only by the civilian employees and their families, but also by the United States defense forces stationed on the Isthmus. Practically all facilities are utilized to their capacity during visits of units of the United States Navy. The cost of these physical and recreational facilities is more than repaid in increased efficiency and morale of the organization and in improved general welfare and health of the entire Canal Zone population. There is ample justification for the continuation of reasonable expenditures such as have been made in the past.

POSTAL SYSTEM

Nineteen post offices were in operation by the Canal Zone postal system at the end of the year. These included eight post offices in civilian towns of the Canal Zone, nine at the United States Army posts, and two at United States Naval stations. During the year, a post office was established at Howard Field to serve that post and Fort Kobbe.

Net receipts for the postal system were \$103,071 for the fiscal year 1941. Operations for the past year are summarized and compared with the preceding fiscal year in the following table:

	1941	1940
Sale of postage stamps, postal cards, stamp books, etc.....	\$606,936	\$436,228
Money order fees.....	41,474	24,944
Box rents collected.....	27,914	22,018
All other receipts.....	26,130	18,264
Total receipts.....	705,454	501,454
Total expenses.....	602,383	486,115
Net surplus.....	103,071	15,339

The sale of commemorative stamps released July 15, 1939, and August 15, 1939, was discontinued on February 28, 1941, and all unsold stamps were recalled and destroyed. On April 21, 1941, a 15-cent postage due stamp was added to the permanent series. The practice of issuing perforated stamps for official use was discontinued and on April 8, 1941, a supply of regular and air mail stamps of various denominations were surcharged "Official, Panama Canal" for issue to departments and divisions of the Panama Canal and Panama Railroad Co. for official use exclusively.

On June 13, 1940, the President approved an act to amend Chapter 14 of title 2 of the Canal Zone Code relating to the Canal Zone postal service (see Public No. 626-76th Congress). The amended chapter containing sections 271 to 281 of title 2 authorized the Governor of the Panama Canal to maintain and operate a postal savings system. Although new postal savings forms were placed in use on August 13, 1940, the general regulations governing the operation of the former deposit money order system remain practically unchanged. The interest rate of 2 percent per annum, payable on deposit money orders, was continued without change as related to postal savings certificates.

Statistics covering the transactions in postal savings certificates, with comparative figures for 1940, are given in the following table:

Postal savings certificates	1941	1940
Number of certificates issued	41, 151	24, 187
Value of certificates issued	\$3, 303, 230	\$2, 017, 380
Number of certificates paid	31, 796	22, 511
Value of certificates paid	\$2, 388, 480	\$1, 849, 300
Funds on hand at end of year	\$3, 153, 020	\$2, 238, 270

Statistics covering the operation of the money order business during 1941, with comparative figures for 1940, are given in the following table:

Money orders	1941	1940
Number of orders issued	398, 861	233, 764
Value of orders issued	\$8, 032, 333	\$4, 244, 052
Fees collected	\$44, 474	\$24, 944
Number of orders paid	54, 832	49, 746
Value of orders paid	\$906, 028	\$700, 966

Other statistics relative to the operation of the Canal Zone postal system are presented in the following table:

	1941	1940
Registered and insured articles dispatched:		
Official letters and parcels registered free	62, 578	47, 528
Foreign registered letters	32, 563	28, 504
Foreign registered parcels	2, 760	2, 991
Domestic registered letters	33, 908	30, 512
Domestic registered parcels	119	43
Insured parcels	12, 116	8, 108
Total registered and insured articles dispatched	144, 044	117, 686
Registered and insured articles received:		
Registered articles	105, 146	82, 522
Insured parcels	76, 085	45, 006
Foreign parcel post	3, 284	4, 019
Total registered and insured articles received	184, 515	131, 547
Dispatches of mail by steamers—Cristobal:		
Dispatches made to the United States	287	456
Dispatches made to foreign countries	1, 130	1, 327
Total dispatches made by steamer	1, 417	1, 783
Dispatches received from United States	570	656
Dispatches received from foreign countries	1, 025	1, 654
Total dispatches received by steamer	1, 595	2, 310
Dispatches of mail by steamer—Balboa:		
Total dispatches made	1, 158	1, 844
Total dispatches received	1, 973	2, 281

AIR MAIL

Air mail operations continued to expand during the year. Sales of air mail postage amounted to \$334,224 compared with \$209,843 during the previous year, an increase of \$124,381, or about 59 per-

cent. Transportation charges for air mail amounted to \$293,732, an increase of \$106,848, or 57 percent, as compared with the preceding year. Therefore, the difference between the sale of air mail stamps and transportation charges during the year amounted to \$40,492, or a return of 13.8 percent for operating expenses.

On September 1, 1940, direct nonstop air mail service was established between the Canal Zone and Miami, Florida, reducing the time of transit from 10 to 6 hours. While no change was made in the number of trips over such route (three times a week in each direction), the establishment of this fast service had the effect of reducing the time of transit to all points served by the route operating between Cristobal and Buenos Aires. As a result of the new schedules a transfer agency was established at Cali, Colombia, to handle air mail matter exchanged between the United States and Latin American countries. This agency supersedes Cristobal as the main transfer point for air mail and is operated under the control of the Director of Posts as an adjunct to the Canal Zone postal service.

During the year air mail service between the Canal Zone and Brownsville, Tex., was increased from five times weekly to a daily service in each direction. Service between Cristobal and Trinidad was increased from three times weekly to a daily service in each direction. Additional service was established between the Canal Zone and Colombia and Ecuador. At the end of the year the number of mail planes arriving and departing each week had increased to 42.

IMMIGRATION VISAS

During the fiscal year 1941, 160 visas were issued by the Executive Secretary to alien residents of the Canal Zone traveling to the United States. Of these, 95 were quota immigration visas, 29 were passport visas, 27 were nonquota visas, 8 were transit certificates, and 1 was a limited entry certificate. Fees collected for visas amounted to \$1,239.75.

RELATIONS WITH PANAMA

During the year, correspondence was conducted between the Governments of the Canal Zone and of the Republic of Panama with reference to various matters of local joint interest, arising from the relations of the two Governments and the proximity of their respective areas. The greater part of this correspondence was of a routine nature, dealing with matters relating to customs, immigration, municipal improvements, public health, postal service, repatriation of aliens and vital statistics.

CUSTOMS

The various activities of the Bureau of Customs were continued along the lines outlined in previous annual reports. The following is a statistical summary of the principal items, with the figures for the preceding year shown for comparison:

Item	Fiscal year 1941	Fiscal year 1940
Vessels entered	11, 100	12, 090
Vessels cleared	11, 092	12, 084
Aircraft entered	2, 334	1, 421
Aircraft cleared	2, 336	1, 419
Vessels of United States registry entered	4, 430	4, 453
Vessels of United States registry cleared	4, 425	4, 456
Customs releases on shipments consigned to Panama	13, 457	13, 163
Free-entry releases for shipments to employees of U. S. Government	18, 298	10, 149
Arrests for violation of Narcotic Drug Import and Export Act.	0	0
Arrests for violation of customs regulations	16	24
Shipments of household goods of employees to United States, inspected and sealed for shipment to United States	119	85
Pieces of freight included in above	856	683
Invoices certified for shipment to United States	924	833
Special customs inspection out of regular hours:		
Cristobal	750	847
Balboa	608	453
Total	1, 358	1, 330
Chinese passengers arriving	140	352
Chinese admitted to Panama	92	101
Vessels with Chinese crews checked	331	394

SHIPPING COMMISSIONER

The Shipping Commissioner and his deputies have the same authority as shipping commissioners in the United States ports and United States consuls in foreign ports with respect to United States seamen. During the fiscal year 1,520 seamen were shipped in vessels of the United States and 1,262 were discharged. No sick or destitute seamen were returned to the United States at the expense of the appropriation for relief of destitute American seamen, but 112 were signed on vessels as workaways, and returned to the United States without expense to the Government.

The total wages earned by seamen who were discharged at Canal Zone ports amounted to \$123,695, and the total approved deductions on account of advances, allotments, fines, slop-chest account, etc., amounted to \$41,077. The balance of \$82,618 was either paid to seamen under supervision of the deputy shipping commissioners or received on deposit for the seamen by the deputy shipping commissioners. The wages, moneys, and effects of six American seamen, five of whom died in local hospitals, were handled by the Shipping Commissioner, and remitted to the proper courts in the United States for disposition.

ADMINISTRATION OF ESTATES

When provision for administration has not been made by the deceased, or requested by the legal heirs, the public administrator takes charge of all estates within the Canal Zone which require administration. In the case of estates with total assets exceeding \$1,000 value, the public administrator charges the regular commissions fixed by law, which are paid into the Treasury of the United States. Commissions amounting \$1,973 were collected during the fiscal year. The estates of 195 deceased or insane persons, with cash assets of \$43,577, were settled during the fiscal year.

LICENSES AND TAXES

Licenses issued for motor vehicles, permits for peddling foodstuffs, sales of merchandise generally, ships' runners, and similar purposes numbered 22,094 for the year, and 6,498 motor-vehicle licenses were transferred during the year.

The number of motor-vehicle licenses and transfers and miscellaneous licenses issued during each of the past 10 years and the aggregate fees collected therefor are summarized below. These include licenses for official vehicles for which no charge is made.

Fiscal year	Motor-vehicle	Motor-vehicle transfers	Miscellaneous	Total	Fees
1932	8,577	1,906	1,312	11,795	\$52,143
1933	8,432	2,270	1,155	11,857	50,039
1934	8,389	2,311	1,392	12,092	52,796
1935	10,397	2,685	1,122	14,204	56,110
1936	10,268	3,276	1,258	14,802	61,482
1937	11,467	3,623	1,077	16,167	63,967
1938	11,885	3,871	1,146	16,902	66,574
1939	12,097	3,859	1,137	17,093	67,636
1940	15,167	4,568	1,058	20,793	77,574
1941	20,979	6,498	1,115	28,592	113,184

FOREIGN CORPORATIONS

Foreign corporations doing business in the Canal Zone are required to secure licenses, and during the year 119 such corporations, the majority of which are steamship lines and steamship agencies, were licensed. Fees amounting to \$1,190 were collected. Taxes paid by corporations amounted to \$195.

INSURANCE

The license fee for insurance companies doing business in the Canal Zone is \$10 per year. At the end of the past fiscal year 20 insurance companies were licensed to write insurance in the Canal Zone. These companies reported that as of December 31, 1939, a total of 1,441 policies were in force. During the calendar year 1940, 529 policies were issued and 367 canceled, leaving 1,603 in force as of December 31, 1940, having an aggregate face value of \$5,064,960.99. Premium collections during the calendar year 1940 totaled \$194,494.33.

During the calendar year 1940 the premiums received by miscellaneous insurance companies, including accident, automobile liability, fire, surety, fidelity, etc., but excluding life insurance, amounted to \$334,746.44. Losses paid during the year totaled \$18,853.86.

The taxes of 1½ percent on premiums by all classes of insurance companies amounted to \$12,959.83 for the calendar year 1940, as compared with \$4,731.19 during the previous year.

COMMERCIAL AVIATION

The following tabulation presents a brief summary of commercial aviation activity in the Canal Zone for the fiscal year 1941, together with comparative figures for the years 1940 and 1939:

	1941	1940	1939
Number of Passengers carried by regular scheduled airlines:			
Canal Zone and foreign:			
Incoming	10,786	6,451	4,374
Outgoing	10,234	6,530	4,436
Total	¹ 21,020	12,981	8,810
Trans-Isthmian:			
Embarked Albrook Field	2,413	780	2,663
Embarked France Field	2,175	486	1,663
Total	4,588	1,266	4,326
Air express and mail (pounds): ²			
Entered	<i>Pounds</i> 270,838	<i>Pounds</i> 88,752	<i>Pounds</i> 72,365
Cleared	384,563	273,116	213,806
Total	655,401	361,868	286,171

¹ Figures do not include 1,903 transit passengers who arrived without debarking.

² Figures do not include transshipped cargo which entered and cleared without being unloaded in the Canal Zone.

It will be noted that the Canal Zone and foreign passenger traffic showed an increase of 62 percent and that there was an increase of 81 percent in the amount of air express carried. Trans-Isthmian air travel also showed a large increase, the volume being almost four times as great as in 1940.

SECTION V

FINANCIAL AND STATISTICAL STATEMENTS

Financial statements of major interest relative to the operation of the Panama Canal are presented in this section. These statements are abstracted from the annual report of the accounting department of the Panama Canal.

ACCOUNTING SYSTEM

Accounts are maintained in accordance with statutory rules and regulations and accepted principles of appropriation and fund accounting prescribed for governmental bodies. However, the activities being of a quasi-business nature, the accounting system has been adapted to conform as nearly as practicable to the principles and practices approved by the Interstate Commerce Commission and State boards regulating public utilities as well as to procedures followed by comparable industries in the corporate field.

For purposes of valuating the investment, July 12, 1920, the date on which the Canal was formally declared open to commercial traffic by Presidential proclamation, was fixed as the close of the construction and development period of the Panama Canal.

Interest on the United States Treasury funds advanced up to July 12, 1920, amounting to \$128,991,063; the treaty payment of \$10,000,000 to the Republic of Panama in 1904, and the annual treaty payment aggregating \$2,000,000 to the Republic of Panama from 1913 to 1920 are considered as being construction cost and are so reflected in the capital investment account. Additions to the capital investment account are made from time to time by the inclusion of the cost of new capital additions; deductions are made of the amounts of assets withdrawn through sale and retirement of depreciated items.

Obligations for treaty payments of \$250,000 annually to the Republic of Panama are reflected in the operating accounts beginning with the fiscal year 1921. A provision in the Treaty of 1936 with the Republic of Panama increased the annual payments to \$430,000 retroactive to the fiscal year 1934, and operating accounts have been adjusted to reflect the increased payment.

Depreciation of depreciable property and equipment is charged to operations at accepted rates, the amounts so charged being accrued in offsetting valuation or depreciation reserve accounts. Using account

balances as of the beginning of the fiscal year, accrued depreciation is deducted from gross capital to establish the investment upon which interest return is calculated.

Subsequent to the fiscal year 1920, a potential capital interest return of 3 percent has been considered as an unrecorded charge to expenses in determining computed surplus or deficit, while net revenues before interest charges have been used to calculate the actual rate of return on net capital investment.

Based on the foregoing, the gross capital investment at the beginning of the fiscal year 1941 was \$559,635,638.06 which, after deducting depreciation of \$36,409,677.61, and Canal defense property amounting to \$14,055,679.78, leaves a net capital investment of \$509,170,280.67. The net revenues of the Canal during the fiscal year 1941 amounted to \$8,852,036.84 on Canal operation and \$1,008,741.70 on business operations, a total of \$9,860,778.54. This net revenue is 1.95 percent of the net capital.

OPERATIONS OF THE PANAMA RAILROAD COMPANY

The results from the operations of the railroad proper and its various business units on the Isthmus are shown in detail in the accounts of the Panama Railroad Co. The detailed statement of revenue, expenses, and statistics for all railroad industries, changes in the capital account, and the results from operations of the steamship line appear in the annual report of the Panama Railroad Co. A review of these activities is presented in section II of this report under the heading "Business operations under the Panama Railroad Co."

All Panama Railroad operations on the Isthmus during the fiscal year 1941 resulted in a net operating income of \$2,645,673.27, as compared with \$2,497,072.70 for 1940, an increase of \$148,600.57 for the year.

PANAMA CANAL OPERATIONS

The major financial results of Panama Canal operations are presented hereinafter in tables Nos. 1 to 27-A, with supplementary comments and explanations.

The following is a list of all of the tables and bureau reports contained in the annual report of the accounting department. The tables and reports Nos. 28 to 58, inclusive, are not printed because they are concerned principally with details of operations which lack general interest, and their publication would be an unwarranted expense. The complete report for the accounting department, as well as those of the other departments and divisions, is on file at the office of the Governor or at the Washington office of the Panama Canal. For purpose of reference, the complete list of tables and reports for the

accounting department is printed below. Following the list are presented the major tables, Nos. 1 to 27-A inclusive, with various notes of explanation.

INDEX TO TABLES

Table
No.

1. General balance sheet.
2. Canal general property.
3. Floating plant.
4. Business fixed property.
5. Business equipment.
6. Capital assets, depreciable and non-depreciable.
7. Public works, Republic of Panama.
8. Cash receipts and disbursements, appropriated funds.
9. Cash receipts and disbursements, custodial funds.
10. Accounts receivable registered and outstanding.
11. Stores (material and supplies).
12. Work in progress.
13. Deferred charges.
14. Capital investment.
15. Accounts payable.
16. Depreciation reserves.
17. Reserve for repairs.
18. Reserve for leave.
19. Deferred credits.
20. Income, expenses, and net revenues (current).
21. Revenues, expenses, and computed surplus.
22. Capital refundments (miscellaneous receipts and Canal appropriations).
23. Balance of revenues and refundments.

Details of Operation for Profit and Loss

(Summaries on Tables 20 and 21)

24. Canal revenues.
25. Canal earnings, expenses, and net revenues.
26. Business revenues, expenses, and profit or loss.

Miscellaneous

27. Balances in appropriation and fund accounts.
- 27A. Funded reserves, fiscal year 1941.

Addenda Not Published

28. Collections of U. S. funds by collector.
29. Cost of dredging.
30. Cost of electric current.
31. Cost of water.
32. Postal service—revenues, expenses and surplus.
33. Postal service—money order funds balance sheet.
34. Postal service—money orders issued and paid, 1907 to 1941, inclusive.
35. Clubhouse, postal money order and savings funds.
36. Clubs and playgrounds—balance sheet.
37. Clubs and playgrounds—income and expenditures.
38. Audited Isthmus pay rolls.
39. Pay roll deductions.

Addenda Not Published—Continued

40. Silver quarters statistics.
41. Health department bills and miscellaneous bills.
42. Recapitulation of pay-roll deductions (silver employees).
43. Rent collections (gold quarters) from non-employees.
44. Commissary coupons issued, sold, and honored.
45. Accounts payable registered—Panama Canal.
46. Accounts payable registered—Panama Railroad.
47. Personal injury claims.
48. Injuries and deaths, Panama Canal and Panama Railroad.
49. Injuries and deaths—payments under various acts.
50. Damages to vessels.
51. Freight and cargo claims.
52. Shipments under "Government losses in shipment" act (Pub. No. 192, 75th Cong.).
53. Report of Canal accounting bureau.
54. Report of railroad accounting bureau.
55. Report of commissary accounting bureau.
56. Report of claims bureau.
57. Report of pay roll section, claims bureau.
58. Report of auditing bureau.
59. Report of coupon accounting bureau.
60. Report of general bureau (mail, files, and employees' bonds).
61. Report of inspection bureau.

TABLE NO. 1.—General balance sheet, June 30, 1941

ASSETS

Capital assets:

Canal general property (table No. 2).....	\$495,350,849.58
Floating plant (table No. 3).....	9,093,751.74
Canal defense property.....	31,083,202.24
Additional facilities (third set locks).....	13,274,221.61
Business fixed property (table No. 4).....	35,245,323.34
Business equipment (table No. 5).....	4,111,036.61

Total capital assets (table No. 6).....	\$588,158,385.12
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Reimbursable capital expenditures: Public Works, Republic of Panama (table No. 7)...	923,524.59
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Custodial funds:

Special deposit funds—

Clubhouse funds.....	\$539,676.68
Money order funds.....	5,432,125.54
Security deposit funds.....	1,224,694.49

Total special deposit funds (see contra).....	7,196,496.71
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Revenue due U. S. Treasury.....	121,263.13
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Total custodial funds (table No. 9).....	7,317,759.84
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Working assets:

Appropriated funds—

With U. S. Treasury.....	\$16,733,341.68
With fiscal officers.....	8,769,342.64

Total appropriated funds (table No. 8).....	25,502,684.32
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Accounts receivable (table No. 10).....	2,654,417.11
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Stores (table No. 11).....	5,382,211.66
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Work in progress (table No. 12).....	533,339.51
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Total working assets.....	34,072,652.60
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Deferred charges (table No. 13).....	1,132,363.15
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Total assets.....	631,604,685.30
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TABLE No. 1.—*General balance sheet, June 30, 1941*—Continued

LIABILITIES	
Capital investment:	
Net appropriations by Congress.....	\$464, 210, 846. 71
Interest during construction.....	128, 991, 063. 00
Total capital investment (table No. 14).....	\$593, 201, 909. 71
Special deposit accounts (see contra).....	7, 196, 496. 71
Accounts payable (table No. 15).....	4, 605, 108. 07
Reserve for repairs (table No. 17).....	459, 770. 92
Reserve for leave (table No. 18).....	1, 254, 651. 22
Deferred credits (table No. 19).....	2, 351, 994. 59
Revenues and refundments:	
Net revenues to June 30, 1940.....	\$271, 237, 715. 62
Net revenues fiscal year 1941 (table No. 20).....	9, 860, 778. 54
Total net revenues (table No. 21).....	281, 098, 494. 16
Canal depreciation (table No. 16).....	23, 857, 494. 63
Plant depreciation (table No. 16).....	14, 920, 374. 47
Total.....	319, 876, 363. 26
Less capital refundments (table No. 22).....	297, 341, 609. 18
Balance revenues and refundments (table No. 23).....	22, 534, 754. 08
Total liabilities.....	631, 604, 685. 30

The terms and arrangement of the foregoing balance sheet follow closely the generally accepted principles of corporate accounting, except as to the last item "Revenues and refundments." The statutes require that receipts for tolls, civil revenues, and net profits on business operations shall be covered into the United States Treasury, and relinquished from control of the Panama Canal.

Funds for current operating expenses and capital construction are appropriated by the Congress, and for accounting purposes are considered as provided from the tolls and other receipts covered into the Treasury. Practically all receipts other than those cited above are repayable to Canal appropriations, and may be reexpended, but as the Canal is deprived of tolls revenue, its principal source of income, the reexpendable receipts are insufficient to provide for operation and maintenance, thus requiring the Canal to submit its expenditure program annually to the Congress.

Total net revenues, appearing under the caption "Revenues and refundments," represent the accumulated operating earnings of the Panama Canal before capital interest charges. This net revenue, however, has been covered into the United States Treasury in the form of tolls and other receipts. It therefore follows that net capital refundments and net revenues earned will always be approximately the same, except for the fluctuation of unexpended appropriated cash and other working capital items.

These various fund requirements leave the Panama Canal balance sheet without an equivalent for the usual corporate "surplus account,"

since any surplus is included in the tolls covered into the Treasury, by law. However, the equivalent for "surplus account" is shown in Table No. 21, which compares "Total net revenues" of \$281,098,494.16, appearing on the balance sheet, with the computed interest on the net capital investment, by fiscal years beginning with 1921, but no interest charge against the Canal is actually made by the United States Treasury.

TABLE No. 2.—*Canal general property, fiscal year 1941*

	Balance July 1, 1940	Additions and transfers	Retire- ments and transfers	Balance June 30, 1941
Channels, harbors, and basins:				
Balboa to Pedro Miguel.....	\$21,309,928.86			\$24,309,928.86
Pedro Miguel to Gatun.....	113,466,691.77			113,466,691.77
Gatun to Cristobal.....	12,829,445.51			12,829,445.51
Breakwaters:				
Naos Island.....	1,075,874.10			1,075,874.10
Colon—East.....	3,994,727.10			3,994,727.10
Colon—West.....	4,528,829.57			4,528,829.57
Locks:				
Miraflores.....	24,652,856.75			24,652,856.75
Pedro Miguel.....	16,776,469.11			16,776,469.11
Gatun.....	37,911,498.12			37,911,498.12
Floating caisson.....	347,868.15			347,868.15
Towing locomotives.....	1,505,397.32			1,505,397.32
Dams:				
Miraflores.....	1,228,561.63			1,228,561.63
Pedro Miguel.....	457,302.32			457,302.32
Madden.....	9,771,733.41	\$1,270.57		9,773,003.98
Gatun.....	10,475,913.56			10,475,913.56
Gatun—Mindi levee.....	148,974.22			148,974.22
Spillways:				
Miraflores.....	1,398,684.91			1,398,684.91
Gatun.....	4,323,538.02			4,323,538.02
Aids to navigation:				
Channel aids.....	627,656.80			627,656.80
Transit aids.....	21,191.04			21,191.04
Coastal aids.....	175,069.78			175,069.78
Lighthouse depot.....	50,700.85			50,700.85
Wharves and piers:				
Balboa (Nos. 14 to 19).....	4,102,186.34			4,102,186.34
Gamboa.....	295,430.16			295,430.16
Cristobal (Nos. 6, 14, 15).....	2,753,278.57			2,753,278.57
Dry docks:				
Balboa.....	3,645,313.06			3,645,313.06
Cristobal.....	671,630.14			672,437.70
Block storage shed (completed).....		807.56		
Coaling plants:				
Balboa.....	2,284,568.35			2,284,568.35
Cristobal.....	3,679,797.59			3,679,797.59
Dredging division plant.....	899,496.05			923,807.32
Excavator No. 3 (completed).....		1,238.00		
Excavator No. 4.....		21,287.46		
Tractor and bulldozer.....		10,783.81		
Ferry plants:				
Thatcher ferry plant.....	588,925.17			588,925.17
Miraflores ferry plant.....	50,037.61			66,242.15
Landings.....		9,473.12		
Barge No. 106 (conversion).....		6,574.88		
Barge No. 108 (conversion).....		156.54		
Titles and treaty rights:				
Purchase price, new Panama Canal Co. Treaty payment to Republic of Panama, 1904.....	31,717,335.97			31,717,335.97
Annual treaty payments to Republic of Panama, 1913-1920.....	10,000,000.00			10,000,000.00
Relocation of Panama Railroad.....	2,000,000.00			2,000,000.00
Re-equipment of Panama Railroad.....	9,800,626.46			9,800,626.46
Depopulation, Canal Zone.....	3,247,332.11			3,247,332.11
	2,701,016.24			2,701,016.24

¹ Original purchase price of \$10,000,000, less Panama Railroad Co. capital stock and sales and transfers of property acquired.

TABLE NO. 2.—*Canal general property, fiscal year 1941—Continued*

	Balance July 1, 1940	Additions and transfers	Retire- ments and transfers	Balance June 30, 1941
General buildings and structures:				
Office buildings	\$2,102,599.08			\$2,102,599.08
Gorgas Hospital	1,822,586.56			1,849,244.89
Alterations, isolation ward		\$991.19		
Elevator, section "A"		25,667.14		
Corozal Hospital	549,263.22			580,634.58
Alterations, Bldg. No. 521		31,371.36		
Colon Hospital	349,324.27			349,324.27
Dispensaries	243,203.32			243,203.32
Palo Seco Colony	149,218.40			151,091.10
Ward building No. 20 (completed)		1,872.70		
Quarantine stations	65,392.70			65,392.70
Other health department structures	116,787.53			116,787.53
Playgrounds	295,600.51			295,600.51
Post offices	233,245.34			233,245.34
Schoolhouses	1,833,377.08			2,122,969.15
Junior College, Section "A," Balboa (part)		289,592.07		
Fire stations	121,749.77			121,749.77
Police stations	284,387.98			284,387.98
Prisons	30,000.00			30,000.00
Courthouses	187,732.73			187,732.73
Other buildings and structures	490,421.33			512,057.45
Building No. 778, Balboa, relocate		657.44		
Paint and carpenter shop, Gatun locks (completed)		11,454.15		
Office building, Summit experimen- tal gardens		9,521.53		
Permanent town sites	1,973,990.01			2,000,958.58
Ancon		9,423.09		
Balboa		14,862.79		
Pedro Miguel		2,682.69		
Roads, streets, and sidewalks	5,013,471.99			5,522,953.86
Ancon		12,227.91		
Balboa		4,910.67		
Pedro Miguel		4,014.71		
Relocation, Bolivar Highway at Ft. Davis		34,883.14		
Road, Gaillard Highway to Miraflores Lake		2,988.56		
Relocation, Gaillard Highway at Ft. Clayton		\$6,198.39		
Trans-Isthmian Highway		325,000.00		
Reconstruction, Gaillard Highway, Corozal to Ft. Clayton		34,125.54		
New Garbage Dump Road, Mt. Hope		4,767.19		
Widen Thatcher Highway, Far Fan Road Junction to West Side Ferry- Ramp (part)		365.76		
Sewer system	796,010.81			805,815.95
Ancon		2,595.37		
Balboa		4,933.00		
Cristobal		1,855.62		
Pedro Miguel		421.15		
Street lighting system	213,802.01			219,526.80
Ancon		4,291.57		
Balboa		497.80		
Pedro Miguel		323.45		
Silver City		608.97		
Plans for increasing capacity of Canal	415,000.05		\$415,000.05	
Interest during construction period	128,991,063.00			128,991,063.00
Total, Canal general property	494,791,144.74	974,704.89	415,000.05	495,350,849.58
Canal defense property	14,055,679.78	17,027,522.46		31,083,202.24
Construction, additional facilities:				
Plans, transfer		415,000.05		
Construction and plans		12,859,221.56		
Total, additional facilities		13,274,221.61		13,274,221.61

TABLE NO. 3.—*Floating plant, fiscal year 1941*

	Balance July 1, 1940	Additions and Transfers	Retire- ments and Transfers	Balance June 30, 1941
Tugs and craneboats.....	\$2, 658, 761. 53			\$2, 658, 761. 53
Launches.....	475, 111. 79			597, 486. 28
<i>Albacore</i> , new.....		\$12, 855. 70		
<i>Barracuda</i> , new.....		12, 855. 69		
<i>Bobo</i> , new (part).....		920. 30		
<i>Flying Fish</i> , new.....		7, 539. 07		
<i>Loro</i> , new.....		15, 050. 00		
<i>Mirlo</i> , new.....		15, 050. 00		
<i>Nard No. 2</i> , retired.....			\$2, 666. 79	
<i>Pato Real</i> , new engine.....		4, 556. 00		
<i>Perico</i> , new.....		10, 705. 91		
<i>Pilot Fish</i> , new.....		7, 078. 69		
<i>Pompano</i> , new.....		11, 418. 53		
<i>Sail Fish</i> , new.....		7, 043. 09		
<i>Saw Fish</i> , new.....		5, 534. 96		
<i>Sea Devil</i> , new.....		5, 534. 96		
<i>Shearwater</i> , new engine.....		2, 639. 37		
<i>Snapper</i> , new.....		13, 386. 42		
<i>Swallow</i> , retired.....			7, 128. 01	
Dredges.....	2, 570, 236. 01			2, 570, 240. 71
<i>Paraiso</i> , reboiler (part).....		4. 70		
Dump scows.....	1, 561, 320. 33			1, 613, 402. 84
<i>No. 125</i> , new.....		52, 082. 51		
Machine barges.....	782, 187. 83			1, 250, 739. 30
Drill Barge, new.....		497, 241. 77		
<i>Hydraulic Grader No. 3</i> , retired.....			28, 690. 30	
Lighters.....	192, 747. 42			403, 121. 08
Sand Barges (4), new (completed).....		210, 373. 66		
Total, floating plant.....	8, 240, 364. 91	891, 871. 93	38, 485. 10	9, 093, 751. 74

TABLE NO. 4.—*Business fixed property, fiscal year 1941*

	Balance July 1, 1940	Additions and transfers	Retire- ments and transfers	Balance June 30, 1941
Hydroelectric plant, Gatun.....	\$1, 755, 785. 01			\$1, 755, 785. 01
Diesel electric plant, Miraflores.....	1, 525, 616. 79			1, 525, 616. 79
Substations.....	1, 492, 084. 95			1, 582, 423. 30
Additions, Cristobal.....		\$70, 663. 08		
Additions, Miraflores.....		18, 419. 45		
Additions, Summit.....		1, 255. 82		
Transmission system.....	1, 560, 695. 81			1, 560, 695. 81
Distribution system.....	1, 798, 907. 88			1, 873, 722. 65
Ancon.....		6, 684. 86		
Balboa.....		14, 918. 31		
Pedro Miguel.....		3, 838. 85		
Silver City.....		415. 08		
Summit.....		10, 876. 82		
Balboa-West Side Canal.....		18, 027. 68		
Balboa to Ancon Laundry.....		20, 053. 17		
Madden Dam system.....	1, 302, 275. 85			1, 302, 275. 85
Total, electric power system.....	9, 435, 366. 29	165, 153. 12		9, 600, 519. 41
Electric work.....	234, 502. 12			237, 845. 09
Wiremen's shop, Pedro Miguel.....		3, 343. 57		
Zone water system.....	1, 243, 696. 70			1, 194, 057. 64
Pump stations, adjustment.....			\$584. 40	
Pumps, Miraflores pump station.....		73. 75		
Pumps, Paraiso pump station.....			4, 264. 63	
Stilson's pond reservoir, retired.....			36, 577. 39	
Gatun tank reservoir, retired.....			16, 171. 01	
Stilson's pond-Agua Clara main, retired.....			25, 118. 91	
Distribution lines:				
Ancon.....		4, 906. 55		
Balboa.....		3, 619. 26		
Gatun.....		194. 05		
Pedro Miguel.....		10, 597. 29		
Agua Clara filter station.....		2, 677. 76		
Balboa-West Side Canal.....		10, 000. 48		
Bolivar Highway to locks, Gatun.....		1, 008. 14		
Zone-Panama water system.....	2, 011, 517. 86			2, 775, 904. 04
Pump stations, adjustment.....		584. 40		
Enlarge Balboa pump station.....		47, 288. 01		
Pump station, Paraiso.....		235, 105. 74		
Pumps, Gamboa pump station.....		114, 562. 55		

TABLE NO. 4.—*Business fixed property, fiscal year 1941—Continued*

	Balance July 1, 1940	Additions and transfers	Retire- ments and transfers	Balance June 30, 1941
Zone-Panama water system—Continued.				
Miraflores filter plant:				
Flocculators.....		\$21, 168. 46		
Switchgear and control equipment.....		466. 37		
Wash water controller.....		3, 208. 71		
Wash water tank.....		40, 406. 03		
New reservoirs, Chorillo Hill.....		290, 646. 45		
Water Mains, Gamboa to Paraiso.....		10, 949. 43		
Zone-Colon water system.....	\$787, 913. 38			\$828, 879. 29
Pumps, Mount Hope pump station.....		26, 887. 10		
Mount Hope filter plant.....				
Flocculators.....		11, 068. 18		
Miscellaneous equipment.....		3, 010. 63		
Total, water system.....	4, 043, 127. 94	838, 429. 37	82, 716. 34	4, 798, 840. 97
Municipal engineering work.....	123, 218. 12			123, 218. 12
Balboa shops.....	2, 507, 631. 03			2, 507, 631. 03
Cristobal shops.....	580, 866. 47			580, 866. 47
Total, mechanical shops.....	3, 088, 497. 50			3, 088, 497. 50
Balboa fuel-oil plant.....	910, 751. 01			957, 296. 86
Gasoline storage tank.....		34, 411. 06		
10" pipe line from Dock 4.....		12, 134. 79		
Cristobal fuel-oil plant.....	1, 234, 680. 73			1, 288, 701. 87
Fuel-oil tank No. 155, retired.....			\$55, 052. 23	
Steel tank, Mount Hope.....		38, 249. 74		
Gasoline storage tank.....		40, 232. 63		
8" gasoline line, pier 16.....		27, 373. 14		
Pipe line from tank No. 157.....		3, 217. 86		
Total, fuel-oil plants.....	2 145, 431. 74	155, 619. 22	55, 052. 23	2, 245, 998. 73
General storehouses.....	1, 340, 502. 26			1, 426, 704. 06
Storage shed, section G Balboa.....		10, 871. 00		
Storage shed, section K Balboa.....		5, 195. 31		
Temporary storage shed, Balboa.....		4, 203. 29		
Cement shed, Mount Hope.....		65, 932. 20		
Motor transportation.....	157, 754. 00			156, 774. 00
Building No. 5065, Cristobal, retired.....			980. 00	
Motorcar repair shops.....	197, 839. 74			209, 431. 64
Shop building, Cristobal.....		11, 591. 90		
Building division.....	74, 461. 38			81, 370. 91
Building No. 0601, Balboa, extension.....		8, 184. 53		
Building No. 807-X, Balboa, retired.....			1, 275. 00	
Gold quarters.....	10, 403, 774. 55			11, 095, 664. 64
New quarters:				
Balboa.....		373, 467. 09		
Cristobal.....		6, 911. 65		
Gamboa, adjustment.....			670. 53	
Gatun.....		4, 564. 17		
Pedro Miguel.....		49, 396. 86		
Nurses quarters, Gorgas Hospital.....		7. 40		
Alterations and improvements.....		10, 571. 90		
Garages, transfer.....		252, 491. 09		
Retirements, various.....			4, 849. 54	
Silver quarters.....	1, 296, 334. 99			1, 348, 217. 18
New quarters:				
La Boca.....		29, 226. 27		
Silver City.....		22, 835. 16		
Bathhouse and cook shed, Camp Bierd.....		181. 48		
Building No. 400, Gamboa, conversion.....		39. 28		
Retirements, various.....			400. 00	
Garages.....	252, 491. 09			
Transfer.....			252, 491. 09	
District quartermaster's supplies.....	48, 480. 69			48, 480. 69
Clubhouse business structures.....	783, 268. 19			783, 759. 80
Bathhouse, Far Fan Beach.....		491. 61		
Total, business fixed property.....	33, 625, 050. 60	2, 018, 707. 47	398, 434. 73	35, 245, 323. 34

TABLE NO. 5.—*Business equipment, fiscal year 1941*

	Balance July 1, 1940	Additions and Transfers	Retirements and Transfers	Balance June 30, 1941
Electric power system.....	\$284,415.91	\$0,127.55		\$290,543.46
Electric work.....	9,981.85			9,981.85
Municipal work.....	394,202.88	54,429.80	\$992.21	447,640.47
Mechanical shops.....	2,180,238.93	66,934.42	4,118.81	2,243,054.54
General storehouses.....	114,323.94		940.00	113,383.94
Motor transportation.....	574,657.29	162,802.69	39,032.25	698,427.73
Motor car repair shops.....	50,857.12	2,189.06	739.75	52,306.37
Building division.....	105,686.90	21,274.70	249.70	129,711.99
Panama Canal press.....	105,042.83	18,059.75	1,199.52	121,903.06
Distriet quartermasters' supplies.....	4,083.20			4,083.20
Total, business equipment.....	3,823,490.94	334,817.91	47,272.24	4,111,036.61

TABLE NO. 6.—*Capital assets, depreciable and nondepreciable, fiscal year 1941*

	Depreciable	Nondepreciable ¹	Balance June 30, 1941
Canal general property:			
Channels, harbors, and basins.....		\$150,606,066.14	\$150,606,066.14
Breakwaters.....		9,599,430.77	9,599,430.77
Locks.....	\$65,920,857.16	15,276,232.29	81,197,089.45
Dams:			
Madden.....	5,508,509.79	4,264,494.19	9,773,003.98
Other.....		12,310,781.73	12,310,781.73
Spillways.....	3,791,569.33	1,930,653.63	5,722,222.96
Aids to navigation.....	877,618.47		877,618.47
Wharves and piers.....	7,150,855.37		7,150,855.37
Dry docks.....	3,339,329.22	978,421.54	4,317,750.76
Coaling plants.....	5,964,365.94		5,964,365.94
Dredging division plant.....	923,807.32		923,807.32
Ferry plants.....	655,167.32		655,167.32
Titles and treaty rights.....		59,406,310.78	59,406,310.78
Office buildings.....	2,102,599.08		2,102,599.08
Gorgas hospital.....	1,849,244.89		1,849,244.89
Corozal hospital.....	580,634.58		580,634.58
Colon hospital.....	349,324.27		349,324.27
Dispensaries.....	213,203.32		213,203.32
Palo Seco Colony.....	151,091.10		151,091.10
Quarantine stations.....	65,392.70		65,392.70
Other health department structures.....	116,787.53		116,787.53
Playgrounds.....	295,600.51		295,600.51
Post offices.....	233,245.34		233,245.34
School houses.....	2,122,969.15		2,122,969.15
Fire stations.....	121,749.77		121,749.77
Police stations.....	284,387.98		284,387.98
Prisons.....	30,000.00		30,000.00
Courthouses.....	187,732.73		187,732.73
Other buildings and structures.....	512,057.45		512,057.45
Permanent town sites.....		2,000,958.58	2,000,958.58
Roads, streets, and sidewalks.....		5,522,953.86	5,522,953.86
Sewer system.....		805,815.95	805,815.95
Street lighting system.....		219,526.80	219,526.80
Interest during construction period.....		128,991,063.00	128,991,063.00
Total, Canal general property (table No. 2).....	103,378,140.32	391,972,709.26	495,350,849.58
Floating plant (table No. 3).....	9,093,751.74		9,093,751.74
Canal defense property (incomplete).....		31,083,202.24	31,083,202.24
Construction, additional facilities (incomplete).....		13,274,221.61	13,274,221.61
Business fixed property (table No. 4).....	35,245,323.34		35,245,323.34
Business equipment (table No. 5).....	4,111,036.61		4,111,036.61
Total, capital assets.....	151,828,252.01	436,330,133.11	588,158,385.12

¹ Channels, harbors, basins, breakwaters, and municipal assets are maintained at original values from current operating expenses. Other nondepreciable property includes excavation and earth fill at locks, dams, and drydocks, and earth saddles at Madden Dam; also certain projects which were incomplete at the close of the fiscal year.

TABLE NO. 7.—*Public works in cities of Panama and Colon, fiscal year 1941*

	Panama	Colon	Total
Status of capital cost to June 30, 1941:			
Construction cost:			
Water works and sewers.....	\$876,353.22	\$623,883.68	\$1,500,236.90
Pavements.....	592,913.23	625,619.03	1,218,532.26
Total construction cost.....	1,469,266.45	1,249,502.71	2,718,769.16
Amortization:			
Water works and sewers.....	573,101.54	407,873.91	980,975.45
Pavements.....	393,295.90	420,973.22	814,269.12
Total amortization.....	966,397.44	828,847.13	1,795,244.57
Capital cost reimbursable:			
Water works and sewers.....	303,251.68	216,009.77	519,261.45
Pavements.....	199,617.33	204,645.81	404,263.14
Capital value, June 30, 1941.....	502,869.01	420,655.58	923,524.59
Operating detail, fiscal year, 1941:			
Operation, maintenance and repairs:			
Waterworks and sewers.....	204,804.79	163,693.45	368,498.24
Pavements.....	4,949.74	8,411.39	13,361.13
Proportion, zone system.....	89,230.10	34,543.16	123,773.26
Street cleaning and garbage collection.....	115,383.85	43,264.60	158,648.45
Total.....	414,368.48	249,912.60	664,281.08
Interest at 2 percent per annum:			
Waterworks and sewers.....	6,202.18	4,417.88	10,620.06
Pavements.....	4,082.62	4,185.46	8,268.08
Proportion, Zone system.....	11,803.75	5,254.83	17,058.58
Total.....	22,088.55	13,858.17	35,946.72
Amortization:			
Water works and sewers.....	18,513.95	13,187.71	31,701.66
Pavements.....	12,186.92	12,493.92	24,680.84
Total.....	30,700.87	25,681.63	56,382.50
Total charged to water rentals.....	467,157.90	289,452.40	756,610.30
Water rental collections in the Republic of Panama.....	467,157.90	289,452.40	756,610.30

The Panama Canal supplies water to the cities of Panama and Colon from the Canal Zone water system, and maintains the sewers and streets in the two cities under a contract entered into between the Panama Canal and the Republic of Panama in 1907. The Panama Canal collects the water rentals from the residents of these two cities and uses the funds to cover the cost of water and maintenance of sewers and streets, interest on the unamortized investment at 2 percent per annum and amortization based on 50 years from 1907.

Interest on the investment amounting to \$35,946.72 and amortization amounting to \$56,382.50 for the fiscal year 1941 has been covered into the United States Treasury as miscellaneous receipts, making the totals to date \$1,719,068.37 for interest, and \$1,795,244.57 for amortization.

TABLE No. 8.—Receipts and disbursements, fiscal year ended June 30, 1941

APPROPRIATED FUNDS

	Disbursing clerk, Wash- ington, D. C.	Paymaster, Canal Zone	Collector, Canal Zone	Total	U. S. Treasury	Total
A ccountable balance July 1, 1940, by appropriations and funds:						
Maintenance and operation, Panama Canal.....	\$35,454.78	\$2,744,303.11	\$40,920.17	\$3,520,678.06	\$3,598,851.55	\$7,119,529.61
Sanitation, Canal Zone, Panama Canal.....	5,142.39	39,825.75	19,117.70	64,085.84	31,764.11	95,849.95
Civil government, Panama Canal and Canal Zone.....	8,985.00	76,600.14	1,097.16	87,282.30	57,082.67	144,364.97
Postal funds, Canal Zone (special fund).....	9,911.15	27,065.32	78,389.25	115,365.72	64,443.17	179,808.89
Reparation of unemployed aliens, Panama Canal.....	598.58	5,468.20	.....	5,468.20	90,000.00	95,468.20
Memorial to Major General George W. Goethals.....	.....	.....	.....	508.58	156,000.00	156,508.58
Total	700,031.90	2,893,262.52	140,121.28	3,793,418.70	3,998,741.50	7,792,160.20
Appropriations for fiscal year 1941:						
Maintenance and operation, Panama Canal.....	.....	.....	.....	.....	38,292,667.00	38,292,667.00
Sanitation, Canal Zone, Panama Canal.....	.....	.....	.....	.....	1,045,393.00	1,045,393.00
Civil government, Panama Canal and Canal Zone.....	.....	.....	.....	.....	1,192,011.00	1,192,011.00
Construction, additional facilities, Panama Canal.....	.....	.....	.....	.....	15,000,000.00	15,000,000.00
Construction, Trans-Isthmian Highway, Canal Zone.....	.....	.....	.....	.....	325,000.00	325,000.00
Total.....	.....	.....	.....	.....	55,855,071.00	55,855,071.00
Transfers between Fiscal Officers:						
Maintenance and operation, Panama Canal.....	22,195,000.00	21,015,621.85	.....	43,210,621.85	715,770.92	43,926,392.77
Sanitation, Canal Zone, Panama Canal.....	280,000.00	2,253,690.29	.....	2,533,690.29	453,743.37	2,987,433.66
Civil government, Panama Canal and Canal Zone.....	50,000.00	1,300,411.47	.....	1,350,411.47	4,118.35	1,354,529.82
Postal funds, Canal Zone (special fund).....	39,000.00	270,000.00	.....	309,000.00	638,672.55	947,672.55
Memorial to Major General George W. Goethals.....	.....	.....	.....	.....	508.58	508.58
Construction, Additional Facilities, Panama Canal.....	900,000.00	10,401,389.95	.....	11,301,389.95	203,036.89	11,504,426.84
Construction, Trans-Isthmian Highway, Canal Zone.....	.....	325,000.00	.....	325,000.00	.....	325,000.00
Total	23,461,000.00	35,586,113.56	.....	59,047,113.56	2,015,850.65	61,062,964.22
Collections repayable to appropriations:						
Maintenance and operation, Panama Canal.....	384,833.52	7,045,591.06	13,946,632.19	21,376,456.77	3,361.51	21,380,118.28
Sanitation, Canal Zone, Panama Canal.....	440,088.36	73,762.01	1,012,222.65	1,526,073.02	242.77	1,526,315.82
Civil government, Panama Canal and Canal Zone.....	62.40	84,029.29	151,400.55	235,492.21	57.56	235,549.80
Postal funds, Canal Zone (special fund).....	.....	.....	682,755.43	682,755.43	.....	682,755.43

TABLE No. 9.—Receipts and disbursements, fiscal year ended June 30, 1941
CUSTODIAL FUNDS

	Disbursing clerk, Wash- ington, D. C.	Paymaster, Canal Zone	Collector, Canal Zone	Total	U. S. Treasury	Total
Accountable balance July 1, 1940:						
Revenue due U. S. Treasury				\$199,404.95		\$199,404.95
Security deposits				845,436.25		845,436.25
Clubhouse funds	\$82,276.13			877,712.38		877,712.38
Money order funds				5,755.67	\$290,250.24	290,005.91
				23,438.09	3,272,161.80	3,295,599.95
Total	32,276.13		1,074,034.96	1,106,311.09	3,562,412.10	4,668,723.19
Receipts:						
Revenue due U. S. Treasury						
Security deposits	1,838.93	\$19,03	18,453,554.84	19,455,412.80		19,455,412.80
Clubhouse funds	68,168.10	9,243,417.08	26,330,219.32	35,641,805.10		35,641,805.10
Money order funds			2,396,612.86	2,396,612.86		2,396,612.86
			8,216,116.71	8,216,116.71		8,216,116.71
Total	70,007.03	9,243,436.71	55,395,503.76	64,679,947.30		64,679,947.30
Total to be accounted for:						
Transfer to U. S. Treasury:						
Clubhouse funds	102,283.16	9,243,436.71	56,440,538.72	65,786,258.59	3,562,412.10	69,348,670.69
Money order funds					2,356,945.59	
					18,087,917.14	
Total cash debits	102,283.16	9,243,436.71	45,995,675.99	55,341,395.86	14,007,274.83	69,348,670.69
Covered into the U. S. Treasury: Revenue due U. S. Treasury						
Transfers and refunds Security deposits	1,838.93	19.03	18,531,696.66	18,533,554.62		18,533,554.62
Disbursements:	90,394.23	9,243,417.08	23,961,011.08	35,294,822.69		35,294,822.69
Clubhouse funds						
Money order funds						
					2,122,942.09	
					5,977,003.15	
Total	92,233.16	9,243,436.71	44,596,285.74	53,930,965.61	8,099,945.24	62,030,910.85
Accountable balance June 30, 1941:						
Revenue due U. S. Treasury						
Security deposits				121,263.13		121,263.13
Clubhouse funds	10,050.00		1,214,644.49	1,224,694.49		1,224,694.49
Money order funds			15,422.94	15,422.94		15,422.94
			49,049.69	49,049.69		49,049.69
Total	10,050.00		1,400,380.25	1,410,430.25	5,907,329.59	7,317,759.84
Total cash credits	102,283.16	9,243,436.71	45,995,675.99	55,341,395.86	14,007,274.83	69,348,670.69

1 Denotes deduction.

* Includes \$2,208,092.13 invested in U. S. Treasury bonds and \$300,262.26 in Federal farm loan bonds, total \$2,498,354.39, an increase of \$300,000.00 in U. S. Treasury bonds over the preceding year.

Custodial funds cover cash transactions which are controlled by separate fiscal regulations from those which govern the expenditure of appropriations made by Congress for maintenance and operation of the Panama Canal.

Revenue due United States Treasury covers collections for deposit as miscellaneous receipts of the United States Government which form no part of the working cash of the Panama Canal, as these funds must by law immediately be covered into the United States Treasury and relinquished from control of the Panama Canal. These collections consist mainly of tolls, licenses, court fees and fines, and amortization of public works in Panama and Colon.

Security deposits cover cash received by Canal fiscal officers from banks, individuals, and companies to guarantee payment of bills rendered by the Panama Canal and the Panama Railroad Co., and to guarantee fulfillment of contracts. Disbursements of these funds represent transfers to revenue due United States Treasury on this table, collections repayable to appropriations on the preceding table, and the return of unexpended balances to depositors.

Special deposit funds cover certain activities conducted by the Canal Zone Government separately from appropriations, principally postal money order funds, and transactions of Panama Canal club-houses maintained exclusively for employees.

TABLE NO. 10.—*Accounts receivable*
REGISTERED DURING THE YEAR

	Fiscal year 1911	Fiscal year 1910
Repaid to appropriations:		
Panama Railroad Co.	\$3,863,150.31	\$2,812,087.70
Other departments of the United States Government	4,709,304.57	3,519,876.84
Individuals and companies	5,265,929.18	3,767,766.13
Total	13,838,384.06	10,099,730.67
Miscellaneous receipts:		
Tolls	18,190,379.36	21,177,759.82
Public works, Republic of Panama	92,329.22	94,307.08
Miscellaneous		7.02
Total	18,282,708.58	21,272,073.92
Total accounts receivable registered	32,121,092.64	31,371,804.59
Number of bills registered	52,688	40,502

ACCOUNTS RECEIVABLE END FISCAL YEAR

Audited bills	\$2,615,002.43	\$1,513,698.91
Hospital certificates	39,414.68	36,340.73
Injury compensation		5,910.78
Unredeemed commissary coupons		65.37
Total	2,654,417.11	1,556,015.79

The balance at the end of the fiscal year includes all accounts due the Panama Canal except items of utility service, principally from employees, which are not credited to earnings until collected usually by pay-roll deductions.

TABLE NO. 11.—*Materials and supplies*

	Fiscal Year 1941	Fiscal Year 1940
Stock on hand, first of year:		
Balboa store.....	\$3,196,623.96	\$2,798,937.81
Medical store.....	67,974.23	84,779.43
Administration building store.....	40,280.41	31,616.09
Gamboa store.....	388,485.44	401,078.94
Cristobal store.....	710,239.21	589,336.81
Locks store.....	532,708.80	534,830.86
Fuel oil plants.....	103,455.06	54,957.08
Panama Canal press.....	104,885.13	76,686.61
Sand and gravel pile.....	135,057.30	170,113.78
Division stores.....	225,494.33	177,780.46
Total stock card value.....	5,535,203.87	4,920,177.87
Reserve for inventory adjustments.....	244,893.71	277,260.89
Book value of stock on hand.....	5,290,310.16	4,642,916.98
Receipts of material:		
Purchases for stock.....	10,779,388.95	8,586,612.47
Purchases for divisions.....	10,769,787.14	4,879,369.72
Local production.....	1,806,002.57	1,315,625.33
Service charges.....	1,061,039.10	867,362.35
Book value of receipts.....	24,419,217.76	15,648,969.87
Total charges to stock.....	29,709,527.92	20,291,886.85
Issues and sales of material:		
Issues to business divisions.....	16,902,823.21	11,253,535.00
Issues to canal divisions.....	3,423,689.75	1,394,056.66
Variation in division stores.....	¹ 37,612.97	¹ 47,713.87
Total issues.....	20,378,899.99	12,599,877.79
Sales.....	3,948,416.27	2,401,698.90
Total issues and sales.....	24,327,316.26	15,001,576.69
Stock on hand, end of year:		
Balboa store.....	2,986,363.35	3,196,623.96
Medical store.....	134,198.52	67,974.23
Administration building store.....	42,033.77	40,280.41
Gamboa store.....	440,293.39	388,485.44
Cristobal store.....	830,356.58	710,239.21
Locks store.....	525,072.06	532,708.80
Fuel oil plants.....	108,727.97	103,455.06
Panama Canal press.....	114,737.46	104,885.13
Sand and gravel pile.....	141,054.88	135,057.30
Division stores.....	263,107.30	225,494.33
Total stock card value.....	5,585,946.18	5,535,203.87
Reserve for inventory adjustments.....	203,734.52	244,893.71
Book value of stock on hand.....	5,382,211.66	5,290,310.16

¹ Denotes decrease.

In the foregoing table, the values of stock on hand at the beginning and end of the year are shown at invoiced cost including ocean freight.

The storehouse stock-card price includes an added percentage to cover handling cost. This item is shown as "Service charges" under receipts of material and is also reflected in the total of issues and sales.

TABLE No. 12.—*Work in progress*

	Fiscal year 1911	Fiscal year 1940
Electrical division.....	\$23,059.40	\$1,918.81
Municipal division.....	6.74	65.94
Shops and dry docks.....	474,811.52	160,636.57
Building division.....	32,320.26	26,611.04
Panama Canal press.....	3,141.59	2,578.26
Total.....	533,339.51	191,810.62

This account covers the amounts expended on uncompleted jobs, and will ultimately be cleared to operating expenses of the divisions indicated, with corresponding credits to their revenues after application of authorized surcharges.

TABLE No. 13.—*Deferred charges*

	Fiscal year 1941	Fiscal year 1910
Health department.....	\$698.34	\$877.28
Chief quartermaster's office.....		415.00
District quartermaster, Gamboa.....	135.26	
Marine superintendent.....	2,639.37	
Port captain, Balboa.....		4,272.12
Port captain, Cristobal.....	20,268.92	
Lighthouse subdivision.....	3,094.99	510.89
Dredging division.....	268,850.07	207,712.02
Canal Zone experiment gardens.....	3,247.13	
Special engineering division.....	2,560.11	
General accounts, suspense.....	5,548.92	31,142.71
Electric work.....	7,674.94	2,914.66
Telephone, telegraph and signal work.....	144.31	
Water system.....	5,100.81	1,200.00
Municipal work.....	119,379.80	66,498.82
Shops and dry docks.....	77,640.84	91,316.42
Fuel oil plants.....	797.91	695.07
General storehouses.....		30,300.27
Building division.....	156,611.05	206,165.25
District quartermasters' supplies.....	5,349.39	5,797.66
Public works, Panama.....	288,887.53	174,926.17
Public works, Colon.....	163,733.43	72,280.22
Total.....	1,132,363.15	897,024.56

This account covers expenses incurred for account of divisions indicated, but which are not chargeable to operating accounts of the current year. These amounts are cleared as soon as values are consumed.

TABLE No. 14.—*Capital investment*

Appropriations for canal construction to June 30, 1921 (detail in Annual Report for 1924, table No. 3).....	\$386,910,301.00
Deduct value of capital stock of the Panama Railroad Co.....	7,000,000.00
Net construction appropriations.....	379,910,301.00
Annual payments to the Republic of Panama, 1913 to 1920 (State Department).....	2,000,000.00
Additional construction funds, July 1, 1921, to June 30, 1941.....	82,300,545.71
Total cash investment.....	464,210,846.71
Interest on construction funds (compounded annually) 1904 to 1920.....	128,991,063.00
Total capital investment.....	593,201,909.71

The Capital Investment Account covers the following assets, showing the total as of June 30, 1940, the increase for the current fiscal year, and the total as of June 30, 1941.

	June 30, 1940	Increase	June 30, 1941
Canal general property (table No. 2)	\$194,791,144.74	\$559,704.84	\$195,350,849.58
Floating plant (table No. 3)	8,210,364.91	853,386.83	9,063,751.74
Canal defense property	14,055,679.78	17,027,522.46	31,083,202.24
Additional facilities (third set locks)		13,274,221.61	13,274,221.61
Business fixed property (table No. 4)	33,625,050.60	1,620,272.71	35,245,323.34
Business equipment (table No. 5)	3,823,490.94	287,545.67	4,111,036.61
Public works, Republic of Panama (table No. 7)	979,907.09	156,382.50	1,136,289.59
Proportion of working capital (table No. 23)	4,120,000.00		4,120,000.00
Total capital investment	559,635,638.06	33,566,271.65	593,201,909.71
Less accrued depreciation (table No. 16)	36,409,677.61	2,368,191.49	38,777,869.10
Net capital investment	523,225,960.45	31,198,080.16	554,424,040.61

¹ Denotes decrease.

The total capital investment at the close of the fiscal year 1941 amounted to \$593,201,909.71. The increase of \$33,566,271.65 is due to the making of necessary additions to plant and equipment as shown on capital tables Nos. 2, 3, 4, and 5.

Interest on the net capital investment from 1921 to date is considered as a charge to operating expenses, and while this charge does not appear on the balance sheet, a statement of such interest compared with net revenues, by years, is shown on table No. 21. Interest for the current fiscal year is based upon a net capital investment of \$509,170,280.67, as of June 30, 1940, which is the above net capital investment of \$523,225,960.45 less Canal defense property, \$14,055,679.78, and amounts to \$15,275,108.42.

TABLE NO. 15.—*Accounts payable*

	Fiscal year 1941	Fiscal year 1940
United States invoices	\$1,252,698.90	\$536,424.17
Isthmus vouchers	597,129.23	167,304.45
Current pay rolls	2,644,406.76	1,899,068.85
Unpaid salaries and wages	107,059.26	43,219.78
Drums, carboys, and reels	6,351.82	8,551.02
Local purchases	12,537.90	15,541.28
Total	4,605,108.07	2,649,026.99

¹ Denotes debit.

The above table covers all current obligations of the Panama Canal, except deposits to guarantee payment of bills, and special deposit funds, all of which are covered by table No. 9, custodial funds.

TABLE NO. 16.—*Depreciation reserves, fiscal year 1941*

CANAL DEPRECIATION

	Balance July 1, 1940	Accruals	Retirements	Balance June 30, 1941
Locks.....	\$12,067,316.36	\$493,761.55		\$12,561,080.91
Madden Dam.....	274,481.48	55,085.09		329,566.57
Spillways.....	533,013.00	21,320.52		554,333.52
Aids to navigation.....	392,739.13	11,953.72		404,692.85
Wharves and piers.....	2,393,039.42	144,321.60		2,537,361.02
Drydocks.....	816,196.23	42,394.54		858,590.77
Coaling plants.....	3,339,001.12	151,256.06		3,490,256.18
Dredging division plant.....	460,275.60	21,964.51		482,240.11
Ferry plants.....	235,038.24	22,141.03		257,179.27
Office buildings.....	439,455.06	24,449.68		463,904.74
Gorgas Hospital.....	390,079.95	18,846.33		408,926.28
Corozal Hospital.....	95,978.06	6,537.72		102,515.78
Colon Hospital.....	76,803.12	4,942.78		81,745.90
Dispensaries.....	56,026.95	3,301.04		59,327.99
Palo Seco colony.....	38,685.52	3,284.94		41,970.46
Quarantine stations.....	65,392.70			65,392.70
Other health department structures.....	31,420.45	2,402.57		33,823.02
Playgrounds.....	78,292.61	8,217.98		86,510.59
Post offices.....	9,826.92	2,462.86		12,289.78
Schoolhouses.....	237,131.55	24,461.31		261,592.86
Fire stations.....	31,830.87	2,541.34		34,372.21
Police stations.....	14,919.06	6,262.05		21,181.11
Prisons.....	6,000.00	750.00		6,750.00
Courthouses.....	88,662.65	3,754.65		92,417.30
Other buildings and structures.....	246,296.90	7,141.39		253,438.29
Contingent reserve.....	239,585.68	116,438.74		356,024.42
Total Canal depreciation.....	22,657,494.63	1,200,000.00		23,857,494.63

PLANT DEPRECIATION

	Balance July 1, 1940	Accruals	Retirements	Balance June 30, 1941
Floating plant:				
Tugs.....	\$963,620.00	\$89,940.00		\$1,053,560.00
Launches.....	250,630.79	33,472.25	\$9,794.80	274,308.28
Dredges.....	1,654,180.00	88,050.00		1,742,230.00
Dump scows.....	1,025,190.79	36,300.00		1,061,490.79
Machine barges.....	314,420.30	35,271.00	28,690.30	321,001.00
Lighters.....	98,823.96	13,274.00		112,097.96
Total, floating plant.....	4,306,865.84	296,337.29	38,485.10	4,564,718.03
Business fixed property:				
Electric power system.....	1,934,079.19	136,260.00		2,070,339.19
Electric work.....	37,911.51	4,689.36		42,600.87
Water system.....	922,911.09	154,976.70	77,867.31	1,000,020.48
Municipal work.....	7,447.43	2,886.00		10,333.43
Mechanical shops.....	855,851.55	63,485.04		919,336.59
Fuel oil plants.....	867,645.20	108,260.22	55,052.23	920,853.19
General storehouses.....	547,649.05	32,912.25		580,561.30
Motor transportation.....	21,366.14	5,478.00	980.00	25,864.14
Motor car repair shops.....	14,616.32	4,344.00		18,960.32
Building division.....	13,357.50	2,201.25	1,275.00	14,373.75
Gold quarters.....	¹ 1,872,749.63	228,956.64	4,849.54	2,096,556.73
Silver quarters.....	397,160.06	32,692.20	400.00	429,452.26
Clubhouse business structures.....	249,878.08	17,620.14		267,498.22
District quartermasters' supplies.....	10,743.45	2,439.00		13,182.45
Total, business fixed property.....	7,753,366.20	797,290.80	140,424.08	8,410,232.92
Business equipment:				
Electric power system.....	88,438.46	14,220.00		102,658.46
Electric work.....	6,714.87	427.00		7,141.87
Municipal work.....	255,698.10	53,367.49	992.21	308,073.38
Mechanical shops.....	825,802.87	98,642.34	1,767.38	922,677.83
General storehouses.....	73,731.23	5,813.99	940.00	78,605.22
Motor transportation.....	294,001.82	107,569.16	39,032.25	362,538.73
Motor car repair shops.....	27,784.01	3,815.83	739.75	30,860.09
Building division.....	64,244.73	9,674.86	249.70	73,669.89
Panama Canal press.....	52,709.97	4,586.72	1,199.52	56,097.17
District quartermasters' supplies.....	2,824.88	276.00		3,100.88
Total, business equipment.....	1,691,950.94	298,393.39	44,920.81	1,945,423.52
Total, business fixed property and equipment.....	9,445,317.14	1,095,684.19	185,344.89	10,355,656.44
Total, plant depreciation.....	13,752,182.98	1,392,021.48	223,829.99	14,920,374.47

¹ Includes garages.

TABLE NO. 16.—*Depreciation reserves, fiscal year 1941—Continued*

SUMMARY

	Balance July 1, 1940	Accruals	Retirements	Balance June 30, 1941
Canal depreciation	\$22,657,494.63	\$1,200,000.00	-----	\$23,857,494.63
Plant depreciation	13,752,182.98	1,392,021.48	\$223,829.99	14,920,374.47
Total depreciation	36,409,677.61	2,592,021.48	223,829.99	38,777,869.10

The accrued balance as of June 30, 1941, for Canal depreciation applies to depreciable Canal general property shown in table No. 6, amounting to \$103,378,140.32, and for plant depreciation applies to floating plant, business fixed property, and business equipment, shown in tables, Nos. 3, 4, and 5, amounting to \$48,450,111.69.

TABLE NO. 17.—*Reserve for repairs*

	Balance July 1, 1940	Accruals	Charges	Balance June 30, 1941
Tugs and craneboats	83,432.58	93,600.00	57,145.68	119,886.90
Dredges	142,305.64	189,996.00	205,661.59	126,610.05
Dump scows	46,655.65	126,210.00	60,096.32	112,769.33
Machine barges	11,378.95	35,680.00	9,286.22	37,752.73
Lighters	14,898.33	-----	-----	14,898.33
Total, floating plant	298,651.15	445,516.00	332,189.81	411,977.34
Electric work, fixed property	11,591.43	¹ 11,111.80	279.63	-----
Electric work, equipment	25,980.23	46,328.56	48,237.42	24,071.37
General storehouses, fixed property	15,493.66	¹ 15,493.66	-----	-----
Paran a Canal press, fixed property	2,905.26	¹ 2,905.26	-----	-----
District quartermasters' supplies, fixed property	10,573.52	1,215.58	-----	11,489.10
Sand and gravel, equipment	1,914.76	19,478.05	9,159.70	12,233.11
Total, fixed property and equipment	67,958.86	37,511.47	57,676.75	47,793.58
Total reserve for repairs	366,610.01	483,027.47	389,866.56	459,770.92

¹ Denotes debit adjustment.

TABLE NO. 18.—*Reserve for leave*

	Fiscal year 1941	Fiscal year 1940
Electrical division	\$217,826.05	\$145,007.64
Municipal division	541,177.37	193,017.74
Shops and drydocks	280,937.45	233,586.95
Motor transportation	42,790.82	23,861.17
Motor car repair shops	24,423.60	19,969.83
Building division	147,495.93	54,572.45
Total	1,254,651.22	670,015.78

The foregoing table represents the reserve for vacation pay due employees of the principal business divisions. This reserve is credited by adding a percentage to direct labor charges for work performed by the division listed above to the credit of this account. The account is debited with the amount paid to employees when leave is actually taken.

TABLE NO. 19.—*Deferred credits*

	Fiscal year 1941	Fiscal year 1940
Executive offices.....		\$754.51
Comptroller's office.....	\$4,788.00	2,232.96
Paymaster's office.....	641.00	
Civil government.....	17,668.41	41,224.58
Postal service.....	278,073.97	\$7,374.58
Health department.....	204,538.17	35,525.29
Office engineer.....	4,924.72	4,835.02
Meteorology and hydrography.....	2,600.00	807.50
District quartermaster, Balboa.....	38,704.42	28,542.86
District quartermaster, Pedro Miguel.....	3,197.25	80.83
District quartermaster, Gamboa.....	452.64	140.40
Nautical books and charts.....	1,575.66	1,444.44
Port captain, Balboa.....	6,218.66	1,800.00
Lighthouse subdivision.....	9,860.00	14,184.35
Pacific locks.....	5,285.00	32,711.81
Atlantic locks.....	7,636.81	20,310.87
Dredging division.....	99,438.67	20,065.71
Canal zone experiment gardens.....		984.52
Special engineering division.....	352,190.92	
General accounts, suspense.....	38,248.43	66,172.51
Electric power system.....	40,129.35	11,566.59
Electric work.....	42,021.07	8,551.49
Water system.....	11,746.17	
Municipal work.....	773,604.48	308,937.46
Shops and dry docks.....	43,954.21	66,521.78
Fuel oil plants.....	231,095.49	132,553.75
General storehouses.....		67.54
Building division.....		34,480.67
Panama Canal press.....	11,038.83	
Gold quarters.....	21,600.00	34,440.62
Silver quarters.....	26,957.47	
Subsistence section.....	17,032.69	
District quartermasters' supplies.....	5,296.54	1,294.54
Public works, Colon.....	4,646.08	
Contingencies, maintenance and operation.....	45,928.74	45,953.94
Contingencies, sanitation.....	752.67	752.67
Contingencies, civil government.....	148.07	148.07
Total.....	2,351,994.59	1,004,571.86

This account covers expenses accrued or estimated which have been charged to operating accounts, but for which it was impracticable to institute corresponding payments at close of the accounting period. These amounts are cleared as soon as corresponding charges are passed for payment, or contingent expenses arise.

TABLE NO. 20—Consolidated statement of income, expenses, and net revenues

	Fiscal year 1911	Fiscal year 1910
Canal operations:		
Canal revenues:		
Tolls	\$18,190,379.36	\$21,177,243.04
Postal surplus	103,070.86	15,338.78
Other miscellaneous receipts	172,704.22	103,111.97
Total Canal revenues (table No. 24)	18,466,154.44	21,295,723.79
Canal earnings (table No. 25)	9,789,287.65	4,765,307.91
Total revenues	28,255,442.09	26,061,031.70
Canal expenses:		
Executive offices	908,310.35	617,922.36
Playgrounds	85,400.00	83,000.00
Accounting department	755,415.04	625,598.94
Washington office	585,232.47	418,792.32
Civil government	1,487,622.45	1,329,049.98
Postal service	578,996.07	470,815.12
Health department	2,823,461.49	2,011,682.36
Office engineer	1,018,027.48	518,917.74
Meteorology and hydrography	45,960.02	30,221.95
Public buildings and grounds	537,212.93	438,893.44
Marine division	1,826,065.57	1,672,792.11
Locks operation and maintenance	1,582,386.32	1,680,526.96
Locks overhaul	5,091.90	
Dams and spillway	57,438.30	60,160.35
Dredging division	4,622,175.10	2,553,562.86
Municipal expenses	389,820.62	300,146.15
Railroad tracks maintenance	17,997.04	19,959.67
Recruiting and repatriating employees	153,446.11	21,408.01
Transportation of employees on Isthmus	50,000.00	158,483.78
Damage to vessels	243,342.69	13,301.13
Miscellaneous general expenses	1,200,000.00	152,079.98
Depreciation on Canal general property	430,000.00	1,200,000.00
Annual payment to Republic of Panama		430,000.00
Total expenses	19,403,405.25	14,807,258.21
Net Canal revenues (table No. 25)	8,852,036.84	11,253,773.49
Fixed capital charge	14,370,325.32	14,435,030.02
Surplus or deficit	15,518,288.48	13,181,256.53
Business operations:		
Business revenues	69,633,699.85	42,946,491.61
Business expenses	68,621,958.15	41,912,608.55
Net business revenues	1,008,741.70	1,033,886.06
Fixed capital charge	994,783.10	808,207.64
Surplus or deficit	103,958.60	225,678.42
Combined operations:		
Revenues	97,889,141.94	69,007,526.31
Expenses	88,028,363.40	56,719,866.76
Net revenues	9,860,778.54	12,287,659.55
Fixed capital charge at 3 percent	15,275,108.42	15,243,237.66
Surplus or deficit	15,414,329.88	12,955,578.11
Net capital investment (table No. 14)	509,170,280.67	508,107,922.04
Combined net revenues	9,860,778.54	12,287,659.55
Percent of capital return	1.95	2.42

¹ Denotes deficit.

A summary comparison of net revenues and capital interest, by years, from 1921 to date, is shown in table No. 21, following, together with a brief description of accounting policy governing charges to operating expenses.

TABLE NO. 21.—*Revenues, expenses, and computed surplus*

Fiscal year	Tolls	Civil revenues	Business profits	Total revenues	Net appropriation expenses ¹	Net revenues	Capital interest 3 percent ²	Computed surplus ³
1914-1920.....	\$83,303,581.67	\$1,206,579.86	\$536,098.34	\$35,046,259.87	\$86,657,766.89	\$1,611,507.02		\$1,611,507.02
1921.....	11,261,919.31	213,986.19	564,211.20	12,040,116.70	9,578,300.14	2,461,816.56	\$14,574,964.74	\$12,213,148.18
1922.....	11,193,383.47	192,208.85	323,259.16	11,708,851.48	8,469,017.63	3,239,833.85	15,253,780.02	\$12,013,946.17
1923.....	17,507,630.52	184,213.54	1,140,642.50	18,832,486.56	8,240,777.56	10,591,709.00	15,202,430.18	\$4,610,721.18
1924.....	24,289,603.16	392,250.73	901,624.12	25,583,478.01	8,923,905.39	16,659,572.62	15,150,490.33	\$1,508,672.29
1925.....	21,374,604.12	207,954.04	765,916.85	22,348,535.01	8,606,693.44	13,681,841.57	15,099,730.49	\$1,417,888.92
1926.....	22,927,456.03	217,680.50	841,310.29	23,986,446.82	8,543,668.47	15,442,978.35	15,085,580.64	\$57,397.71
1927.....	29,911,623.50	391,623.57	876,536.80	25,485,345.62	9,547,715.02	15,937,630.60	15,068,580.79	\$89,049.81
1928.....	26,943,518.11	232,532.57	736,719.43	27,912,765.11	9,501,200.82	18,411,564.29	15,035,029.29	\$3,536,535.00
1929.....	27,123,534.33	243,391.39	737,850.26	28,104,775.98	10,187,150.71	17,917,625.27	15,013,374.55	\$2,904,250.72
1930.....	27,077,117.36	349,255.35	760,971.66	28,187,344.37	9,893,920.93	18,293,423.44	14,987,527.89	\$3,305,895.55
1931.....	24,644,550.39	346,030.35	562,764.17	25,553,344.91	10,693,353.53	14,859,991.38	14,986,578.04	\$3,191,911.34
1932.....	19,621,158.61	327,444.23	557,095.44	21,501,698.29	10,239,211.84	11,262,486.45	14,943,807.66	\$3,316,586.66
1933.....	24,065,065.16	327,444.23	557,095.44	21,501,698.29	10,239,211.84	11,262,486.45	14,943,807.66	\$3,316,586.66
1934.....	23,338,977.90	81,957.08	1,366,755.12	25,528,486.95	9,555,672.02	11,511,809.27	14,907,732.16	\$3,396,522.79
1935.....	23,506,806.46	119,915.21	1,021,216.61	24,442,152.19	7,931,383.77	17,597,103.18	15,039,203.81	\$2,557,899.37
1936.....	23,147,433.54	98,775.74	920,185.23	24,546,906.90	9,475,067.13	14,900,722.02	15,159,597.04	\$2,757,157.27
1937.....	23,215,192.39	90,335.19	824,612.60	24,130,140.18	10,289,624.05	13,873,945.37	15,205,947.30	\$3,675,476.38
1938.....	23,690,413.82	106,929.55	681,272.48	24,478,615.85	9,575,624.32	14,554,515.86	15,229,992.24	\$3,908,061.01
1939.....	21,177,243.04	118,480.75	1,033,886.06	22,329,609.85	10,145,272.18	14,342,343.67	15,250,404.68	\$2,955,578.11
1940.....	18,190,379.36	273,775.08	1,008,741.70	19,472,896.14	9,614,117.60	12,287,659.55	15,243,257.68	\$3,541,429.88
1941.....	492,532,377.56	5,804,001.13	18,214,738.78	516,551,117.47	235,452,623.31	281,098,494.16	316,937,151.32	\$35,858,657.16
Total.....								

¹ After deduction of Canal earnings repaid to appropriation.² Interest prior to July 12, 1920, is included in capital investment account.³ Deficits.

The above table summarizes by classes the revenues received by the Panama Canal by fiscal years from 1921 and shows the net results from operations after deducting therefrom the net current expenses chargeable to appropriations and the current interest charge on the capital investment. The interest rate of 3 percent has been used in making computations a great many years. The use of this rate received the approval of two organizations which investigated Panama Canal matters and was formally adopted when the present accounting system was established in 1932. It has been considered a fair and reasonable rate, as the Government at various times has paid much higher rates for the use of money.

Interest chargeable to operations is not included on the balance sheet and no interest charge against the Canal is actually made by the United States Treasury.

Total revenues on the foregoing statement represent receipts which must be covered into the United States Treasury and relinquished from control of the Panama Canal. Earnings repayable to Canal appropriations, and reexpendable by the Canal, are deducted from gross operating expenditures, in order to present a comparison of funds covered into the Treasury with funds chargeable to operating account, exclusive of capital additions.

The absence of tax charges is compensated for by the inclusion in Canal operating accounts of the direct costs of civil government, health and welfare activities. Neither capital nor operating expenses of the Panama Canal include the cost of the military and naval establishments on the Isthmus; however, all important exchanges of services with these interests are covered by cash settlements, or reciprocal allowances.

By including in the accounts all revenues properly applicable to Canal activities and by charging against the total revenue the net appropriation expenses including charges for depreciation and interest at 3 percent on the capital invested but excluding any charge to amortize the investment, there has accumulated as of June 30, 1941, as shown by the above table, a deficit of \$35,838,657.16.

TABLE NO. 22.—*Capital refundments*

Balance June 30, 1940	\$300, 530, 891. 59
Cash covered into United States Treasury	19, 529, 516. 94
Business profits (table No. 8)	\$995, 962. 32
Revenue due United States Treasury (table No. 9)	18, 533, 554. 62
Total	320, 060, 408. 53
Appropriations, fiscal year 1941 (detail below)	56, 285, 071. 00
Less: Net capital additions, current year (table No. 14)	33, 566, 271. 65
Net appropriation for operating account and incomplete construction	22, 718, 799. 35
Net capital refundments, June 30, 1941	297, 341, 609. 18

TABLE No. 22.—*Capital refundments*—ContinuedSCHEDULE OF OPERATING APPROPRIATIONS¹

al year	Mainte- nance and oper- ation	Sanita- tion	Civil govern- ment	Construc- tion, addi- tional facilities	Miscel- laneous	Annual payment to Panama	Total
1914 to 1924	\$59,018,907	\$6,800,000	\$7,126,670		² \$151,344.55	\$1,000,000	\$74,006,921.55
1925	5,851,210	586,266	991,670			250,000	7,679,146.00
1926	7,140,000	653,216	912,150			250,000	8,955,366.00
1927	5,986,094	670,000	999,980			250,000	7,906,074.00
1928	5,830,000	670,000	1,100,000			250,000	7,850,000.00
1929	6,832,000	722,000	1,172,400			250,000	8,976,400.00
1930	8,000,000	820,000	1,201,000			250,000	10,271,000.00
1931	10,162,470	753,900	1,295,190			250,000	12,461,560.00
1932	9,359,808	782,189	1,351,689			250,000	11,743,686.00
1933	11,891,011	755,650	1,300,000			250,000	14,196,661.00
1934	11,172,700	698,426	1,235,278		³ 1,150,000.00	430,000	14,686,404.00
1935	4,971,490	768,501	792,935			430,000	6,962,926.00
1936	6,900,000	874,616	1,022,981			430,000	9,227,597.00
1937	9,149,201	899,793	1,073,950			430,000	11,552,944.00
1938	8,519,000	918,000	1,131,760		⁴ 5,000.00	430,000	11,003,760.00
1939	8,149,000	933,800	1,167,325		⁴ 155,000.00	430,000	10,835,125.00
1940	22,823,087	1,004,535	1,180,802		⁵ 36,307.87	430,000	25,474,731.87
1941	38,292,667	1,045,393	1,192,011	\$15,000,000	⁶ 325,000.00	430,000	56,285,071.00
Total	240,048,645	20,356,285	26,277,791	15,000,000	1,822,652.42	6,690,000	310,195,373.42
Less: Net capital additions, 1922 to 1941 (table No. 14)							82,300,545.71
Net appropriation for Canal maintenance and operation and incomplete construction.							227,894,827.71

¹ Operating appropriations include authorization for capital construction.² Appropriations for increase in compensation.³ N. R. A., \$1,000,000; repatriation of unemployed aliens, \$150,000.⁴ Appropriation for memorial to Major General George W. Goethals.⁵ Navy appropriation.⁶ Appropriation for construction of Trans-Isthmian Highway.⁷ Covers payments to Panama 1921 to 1921. Payments from 1913 to 1920 charged to cost of construction, \$2,000,000.

The total deposits covered into the United States Treasury from the beginning of Canal construction, with minor adjustments to reconcile changes in accounting process, amount to \$525,236,436.89, and deducting therefrom net appropriations for operation and incomplete construction amounting to \$227,894,827.71 as shown above, produces the net capital refundment balance of \$297,341,609.18. Deposits covered into the Treasury consist principally of the earned revenues cited in table No. 21, which total \$516,551,117.47, the balance being made up of sales of property, principally during the construction period, and return of appropriation balances.

Although above table shows a net cash refundment of \$297,341,609.18, such refundment is not deductible from net capital investment as shown in table No. 14, which is considered as measuring the value of the Panama Canal as an instrument of public utility upon which a perpetual return should be earned; furthermore, annual interest on net asset valuation chargeable to operating account is not included in cash transactions with the United States Treasury. Such interest at 3 percent from 1921 to 1941 would have amounted to \$316,937,151.32, as shown in table No. 21, and would have extinguished all capital refundments to date, if such interest charges had been assessed against Canal revenues.

TABLE NO. 23.—*Balance of revenues and refundments*

DEBITS

Revenue due U. S. Treasury (table No. 9)	\$121,263.13
Appropriated cash in U. S. Treasury (table No. 8)	16,733,341.68
Appropriated cash with fiscal officers (table No. 8)	8,769,342.64
Accounts receivable (table No. 10)	2,654,417.11
Stores (table No. 11)	5,382,211.66
Work in progress (table No. 12)	533,339.51
Deferred charges (table No. 13)	1,132,363.15
Total debits	35,326,278.88

CREDITS

Accounts payable (table No. 15)	\$1,605,108.07
Reserve for repairs (table No. 17)	459,770.92
Reserve for leave (table No. 18)	1,254,651.22
Deferred credits (table No. 19)	2,351,994.59
Total credits	8,671,524.80
Net current accounts	26,654,754.08
Less proportion under capital investment	4,120,000.00
Balance	22,534,754.08

A revolving fund now fixed at \$4,120,000 is set up in Canal accounting for working capital, and is credited to capital investment account in addition to funds used for construction and equipment, the total constituting the base for capital interest computations. Net working capital in excess of the revolving fund is considered as a temporary advance of Treasury funds, but is usually less than appropriated funds not withdrawn from the Treasury. Working capital investments are in constant process of accrual and liquidation for account of the United States Treasury.

TABLE NO. 24.—*Canal revenues*

	Fiscal year 1941	Fiscal year 1940
Tolls	\$18,190,379.36	\$21,177,243.04
Postal surplus	103,070.86	15,338.78
Licenses, fees, fines, etc.	170,675.13	102,125.62
Miscellaneous	2,029.09	1,016.35
Total	18,466,154.44	21,295,723.79

Canal revenues shown above comprise earnings which by law must be covered into the United States Treasury as miscellaneous receipts, United States Revenues, and relinquished from control of the Panama Canal, as distinguished from earnings repayable to Canal appropriations shown in tables Nos. 25 and 26.

Owing to a change in the law made effective at the beginning of the fiscal year 1934, the appropriation for postal expenses was discontinued, and postal receipts have been applied to defray such expenses, instead of being covered directly into the United States Treasury, as formerly, and only the surplus of postal receipts over postal expenses is for account of United States revenues.

TABLE NO. 25.—*Canal earnings, expenses, and net revenues*

	Expenses	Earnings	Net expenses
Executive department:			
Executive offices.....	\$908,310.35	\$579,730.09	\$328,580.26
Playgrounds.....	85,400.00		85,400.00
Total.....	993,710.35	579,730.09	413,980.26
Accounting department:			
Comptroller's office.....	641,214.71	458,293.99	182,920.72
Paymaster's office.....	59,111.15	39,752.71	19,358.44
Collector's office.....	55,119.18	37,092.96	18,026.22
Total.....	755,445.04	535,139.66	220,305.38
Washington office.....	585,232.47	365,184.47	220,048.00
Civil government:			
Civil affairs.....	21,247.30		21,247.30
Customs.....	41,262.64	555.50	40,707.14
Division of schools.....	545,891.71	75,028.15	470,863.56
Fire protection.....	189,108.62	37,211.22	151,897.40
Police and prisons.....	663,732.91	182,816.58	480,916.33
Magistrates' courts.....	18,840.31		18,840.31
District court.....	7,538.96		7,538.96
Total.....	1,487,622.45	295,611.45	1,192,011.00
Postal service.....	578,966.07	578,966.07	
Health department:			
Chief health office.....	79,719.83	16,431.80	63,288.03
Gorgas hospital.....	1,530,842.01	1,078,292.24	452,049.77
Colon hospital.....	283,686.51	219,040.06	64,646.45
Corozal hospital.....	171,812.41	49,712.21	122,100.20
Palo Seco Colony.....	48,135.59	30,313.25	17,822.34
Lino dispensaries.....	156,009.02	90,213.24	65,795.78
Quarantine service.....	101,431.68	46,440.22	54,991.46
Sanitation, Panama.....	36,846.62	1,871.13	34,975.49
Sanitation, Colon.....	27,422.68	2,339.42	25,083.26
Sanitation, Zone.....	176,519.86	84,704.93	91,814.93
Street cleaning and garbage collection, Panama.....	153,841.15	115,439.39	38,401.76
Street cleaning and garbage collection, Colon.....	57,694.13	43,270.60	14,423.53
Total.....	2,823,461.49	1,778,068.49	1,045,393.00
Technical divisions:			
Office engineer.....	1,018,027.48	940,249.11	77,778.37
Meteorology and hydrography.....	45,960.02	12,285.07	33,674.95
Total.....	1,063,987.50	952,534.18	111,453.32
Public buildings and grounds:			
Chief quartermaster's office.....	76,334.77	61,000.00	15,334.77
District quartermaster:			
Balboa.....	275,370.01	103,266.70	172,103.31
Pedro Miguel.....	35,430.48	21,419.48	14,011.00
Gamboa.....	23,386.67	17,084.37	6,302.30
Gatun.....	34,009.49	29,428.05	4,581.44
Cristobal.....	92,681.51	67,988.76	24,692.75
Total.....	537,212.93	300,187.36	237,025.57
Marine division:			
Marine superintendent.....	43,792.50	6,761.70	37,030.80
Port Captain, Balboa:			
General.....	142,957.21	6,029.94	136,927.27
Admeasurement of vessels.....	31,354.51		31,354.51
Pilotage.....	190,993.64	92,276.93	98,716.71
Handling lines.....	106,976.95	111,352.00	14,375.05
Tugs.....	152,803.04	141,378.71	11,424.33
Launches.....	109,221.44	120,187.37	10,965.93
Port Captain, Cristobal:			
General.....	135,481.50	23,517.25	111,964.25
Admeasurement of vessels.....	40,252.64		40,252.64
Pilotage.....	222,707.59	187,473.00	35,234.59
Handling lines.....	107,213.11	110,366.00	13,122.89
Tugs.....	166,175.60	193,211.96	27,036.36
Launches.....	87,560.01	120,999.00	33,438.99
Aids to navigation.....	288,545.83	48,826.68	239,719.15
Total.....	1,826,065.57	1,162,380.54	663,685.03

TABLE No. 25.—*Canal earnings, expenses, and net revenues*—Continued

	Expenses	Earnings	Net expenses
Locks operation and maintenance:			
Pacific locks:			
Miraflores Locks	\$541,574.92	.....	\$541,574.92
Pedro Miguel Locks	438,656.63	.....	438,656.63
Quadrannual overhaul.....	5,094.90	.....	5,094.90
Total.....	985,326.45	.....	985,326.45
Atlantic Locks: Gatun Locks.....	602,154.77	.....	602,154.77
Total.....	1,587,481.22	.....	1,587,481.22
Dams and spillways:			
Gatun Dam	8,095.49	.....	8,095.49
Gatun Spillway.....	3,056.48	.....	3,056.48
Madden Dam	46,286.33	.....	46,286.33
Total.....	57,438.30	.....	57,438.30
Dredging division:			
Atlantic entrance.....	55,894.48	.....	55,894.48
Gatun Lake	77,988.68	.....	77,988.68
Gaillard Cut.....	1,012,902.05	.....	1,012,902.05
Miraflores Lake.....	3,606.83	.....	3,606.83
Pacific entrance.....	190,727.47	.....	190,727.47
Cristobal Harbor.....	956.50	.....	956.50
Barro Colorado Harbor.....	63,300.72	.....	63,300.72
Removal of floating obstructions.....	35,210.55	.....	35,210.55
Maintenance of floating cranes.....	88,901.94	.....	88,901.94
Dredging division work.....	3,092,656.18	\$3,092,862.55	176.37
Total.....	4,622,175.40	3,092,862.55	1,529,312.85
Municipal expenses:			
Street lighting.....	20,410.25	.....	20,410.25
Water for municipal purposes.....	23,400.00	.....	23,400.00
Roads, streets and sidewalks.....	167,664.24	.....	167,664.24
Sewer system.....	24,885.76	.....	24,885.76
Thatcher ferry.....	153,460.37	.....	153,460.37
Total.....	389,820.62	.....	389,820.62
Miscellaneous general expenses:			
Recruiting and repatriating employees.....	16,437.26	.....	16,437.26
Repatriating alien ex-employees.....	1,559.78	.....	1,559.78
Transportation on the Isthmus.....	153,446.11	.....	153,446.11
Damage to vessels.....	50,000.00	.....	50,000.00
Canal Zone experiment gardens.....	163,622.79	148,622.79	15,000.00
Depreciation on Canal general property.....	1,200,000.00	.....	1,200,000.00
Annual payment to the Republic of Panama.....	430,000.00	.....	430,000.00
Cash relief to alien ex-employees.....	79,719.90	.....	79,719.90
Net Canal expenses.....	19,403,405.25	9,789,287.65	9,614,117.60

¹ Denotes credit balance.

SUMMARY

Canal revenues (table No. 24).....	\$18,406,154.44
Net Canal expenses.....	9,614,117.60
Net canal revenues.....	8,852,036.84

The earnings of the divisions engaged in the transiting of vessels through the Canal, as well as earnings of sanitation and civil government divisions, are deducted from gross expenses to arrive at the net expenditure from Canal appropriations, which in turn is deducted from Canal revenues to arrive at net Canal revenues, exclusive of business division profits.

Earnings of the executive offices and accounting department represent principally a proportional charge against business divisions of the Panama Canal and the Panama Railroad Co. Business divisions are reimbursed for this proportional expense by adding a

surcharge to the direct cost on all work performed. The Panama Railroad's proportion is distributed to the various units of that organization.

The earnings of the Washington office comprise charges against business storehouses operations to cover a proportional part of the cost of purchasing, inspection, and handling of material used by business divisions or sold to outside interests, which expense is covered through surcharges added to the price of material.

TABLE NO. 26.—*Business expenses, revenues, and profit or loss*

Division	Expenses	Revenues	Profit or loss
Electric power system.....	\$840,682.35	\$1,128,870.59	\$288,188.24
Electric work.....	3,426,522.62	3,438,528.08	12,005.46
Telephone, telegraph and signal work.....	216,845.67	216,845.67	-----
Water system.....	611,850.33	694,324.17	82,473.84
Municipal work.....	19,033,115.14	19,047,797.71	14,682.57
Shops and dry docks.....	5,167,281.69	5,246,859.73	79,578.04
Wharfage (Panama Railroad rental).....	-----	105,000.00	105,000.00
Fuel oil plants.....	966,408.45	1,009,931.92	43,523.47
General Storehouses:			
Regular operations.....	24,227,094.30	24,238,030.68	10,936.38
Sale of Government property (net).....	-----	236,336.98	236,336.98
Motor transportation.....	1,367,707.35	1,382,965.23	15,257.88
Motor car repair shops.....	344,926.58	354,416.76	9,490.18
Building division.....	8,981,244.66	8,994,644.44	13,399.78
Panama Canal press.....	378,004.98	388,602.56	10,597.58
Gold quarters.....	859,104.80	864,809.50	5,704.70
Silver quarters.....	383,153.55	383,267.94	114.39
Subsistence section.....	123,148.41	123,148.41	-----
District quartermasters' supplies.....	507,732.71	542,570.33	34,837.62
Sand and gravel operations.....	469,470.98	480,138.85	10,667.87
Public works, Panama.....	445,069.35	467,157.90	22,088.55
Public works, Colon.....	275,594.23	289,452.40	13,858.17
Total.....	68,624,958.15	69,633,699.85	1,008,741.70

The profit on business operations as above, amounting to \$1,008,741.70 compares with profits in 1940 of \$1,033,886.06.

Profits on public works, Panama and Colon, amounting to \$35,946.72 represent interest which has been currently reported for coverage into general funds of the United States Treasury. The balance of the total profits, amounting to \$972,794.98 will be immediately covered into the Treasury as miscellaneous receipts, United States revenues, in accordance with regulations.

Business operations of the Panama Canal are conducted separately from operating activities pertaining directly to the transiting of vessels, and government of the Canal Zone. The annual appropriation acts for the Panama Canal authorize the use of appropriated funds for the conduct of auxiliary business activities, provided that funds so advanced are recovered through earnings, and with further proviso that any net profit derived from such business activities be covered annually into the United States Treasury.

TABLE 27.—Balances in appropriation and fund accounting ledger, June 30, 1941

Assets		U. S. Treasury appropriations	Cash on hand	Accounts receivable	Transfers available	Work in progress and suspense	Storehouse stock	Total
Maintenance and operation, Panama Canal		\$12,210,583.20	\$7,188,534.17	\$2,293,052.87	\$2,198,458.91	\$190,370.41	\$5,230,291.36	\$29,281,290.92
Sanitation, Canal Zone, Panama Canal		12,878.85	256,311.23	154,996.98			140,589.55	564,806.61
Civil government, Panama Canal and Canal Zone		53,869.58	42,410.37	6,253.96	19,092.28		11,330.75	132,966.94
Postal funds, Canal Zone, (special fund)		306,461.58	151,152.47	15,207.53				475,884.58
Repatriation of unemployed aliens, Panama Canal		90,000.00	3,981.99					93,981.99
Memorial to Major General George W. Goethals		156,508.58				3,491.42		160,000.00
Construction additional facilities, Panama Canal		3,903,036.89	1,123,892.41	184,845.77	972,794.98			5,211,775.07
Miscellaneous receipts, United States revenues			121,263.13					1,094,058.11
Total		16,733,341.68	8,890,605.77	2,654,417.11	3,190,346.17	163,861.83	5,382,211.66	37,014,784.22
Liabilities		Working capital allotment	Accounts payable	Transfers payable	Special liabilities	Funded reserves	Balance	Total
Maintenance and operation, Panama Canal		\$4,010,000.00	\$3,714,304.26	\$972,794.98				\$29,281,290.92
Sanitation, Canal Zone, Panama Canal		100,000.00	247,572.03	12,602.08	\$304,632.50		\$15,308,719.21	564,806.61
Civil government, Panama Canal and Canal Zone		10,000.00	105,170.46		17,816.48			132,966.94
Postal funds, Canal Zone, (special fund)			26,582.80	916.32	278,073.37			475,884.58
Repatriation of unemployed aliens, Panama Canal			25.00	136.49			176,311.49	93,981.99
Memorial to Major General George W. Goethals							93,886.50	160,000.00
Construction additional facilities, Panama Canal			517,453.52	2,203,912.30	319,630.81		2,140,778.44	5,211,775.07
Miscellaneous receipts, United States Revenues			1,094,058.11					1,094,058.11
Total		4,120,000.00	5,699,166.18	3,190,346.17	850,153.76	5,275,472.47	17,879,645.64	37,014,784.22

This table shows the status of Panama Canal working capital by the various appropriations and funds by which it is separately accountable under existing laws and Treasury regulations.

A revolving fund of \$4,120,000.00 is set aside in Canal accounting to cover the net investment in current accounts, which sum is included in the capital investment account (table No. 14).

The following table shows the detail of the funded reserves stated in the foregoing table as \$5,275,472.47.

TABLE NO. 27-A.—*Funded reserves, fiscal year 1941*

	Balance, July 1, 1940	Accruals	Expenditures	Balance June 30, 1941
Marine division:				
Tugs and craneboats.....	\$258,571.28	\$29,640.00		\$288,211.28
Launches.....	58,826.38	24,012.81		² 4,122.43
<i>Albacore</i> , purchase.....			\$12,855.70	
<i>Barracuda</i> , purchase.....			12,855.69	
<i>Loro</i> , purchase.....			8,050.00	
<i>Mirio</i> , purchase.....			15,050.00	
<i>Perico</i> , addition.....			10,705.91	
<i>Pompano</i> , addition.....			11,418.53	
<i>Shearwater</i> , addition.....			2,639.37	
<i>Snapper</i> , addition.....			13,356.42	
Machine barges.....	11,913.26	420.00		12,333.26
Total	329,310.92	54,072.81	86,961.62	296,422.11
Dredging division:				
Tugs and craneboats.....	183,616.57	60,300.00		243,916.57
Launches.....	7,353.38	9,459.48		16,812.86
Dredges.....	352,320.00	88,080.00		440,400.00
Dump scows.....	297,555.06	36,300.00		281,772.55
<i>No. 125</i> , construction.....			52,082.51	
Machine barges.....	220,691.07	34,851.00		² 196,699.70
New drill barge.....			452,241.77	
Lighters.....	40,151.06	13,274.00		² 56,948.60
New sand barges (4), addition.....			110,373.66	
Total	1,101,687.14	242,264.48	614,697.94	729,253.68
Total, transit divisions	1,430,998.06	296,337.29	701,659.56	1,025,675.79
Electric power system:				
Hydroelectric plant, Gatun.....	192,221.95	32,520.00		224,741.95
Diesel electric plant, Miraflores.....	106,434.22	27,840.00		134,274.22
Substations.....	224,714.51	31,260.00		168,172.18
Transformer, Miraflores.....			17,139.25	
Transformers, Cristobal.....			70,663.08	
Transmission system.....	115,278.27	23,520.00		138,798.27
Madden Dam system.....	91,489.37	21,120.00		112,609.37
Electric ranges.....	108,765.80	14,220.00		122,985.80
Total	838,904.12	150,480.00	87,802.33	901,581.79
Electric work:				
Fixed property.....	35,571.26	4,689.36		36,917.05
Wiremen's shop, Pedro Miguel.....			3,343.57	
Equipment.....	5,331.15	427.00		5,788.15
Total	40,902.41	5,116.36	3,343.57	42,675.20
Water system:				
Pump station buildings.....	26,440.53	3,588.00		² 17,259.51
Enlarge Baiboa pump station.....			47,288.04	
Pump station machinery.....	54,613.88	7,968.00		² 18,398.29
New pumps, Gamboa.....			61,944.80	
New pumps, Mount Hope.....			23,300.00	
New pumps, Paraiso.....			³ 4,264.63	
Filter plant buildings.....	108,851.73	16,872.00		125,723.73
Filter plant machinery.....	33,568.70	6,780.00		37,139.99
Wash water controller, Miraflores.....			3,205.82	
Wash water controller, Mount Hope.....			2.89	
Reservoirs and tanks.....	54,970.27	53,029.53		107,999.80
Pipe lines—large mains.....	114,347.76	39,643.17		153,990.93

TABLE NO. 27-A.—*Funded reserves, fiscal year 1941—Continued*

	Balance, July 1, 1940	Accruals	Expenditures	Balance, June 30, 1941
Water system—Continued.				
Pipe lines—distribution	\$79,014.28	\$27,096.00		\$92,929.92
Agua Clara			\$2,677.76	
Bolivar Highway to Locks, Gatun			1,008.14	
Gatun			194.05	
Pedro Miguel			9,300.41	
Total	471,807.15	154,976.70	144,657.28	482,126.57
Municipal work:				
Fixed property	4,002.10	2,886.00		6,888.10
Equipment	41,743.33	53,367.49	14,862.09	80,248.73
Total	45,745.43	56,253.49	14,862.09	87,136.83
Mechanical shops:				
Balboa shops	115,732.18	44,043.84		159,776.02
Balboa railroad shops	28,842.69	6,094.20		34,936.89
Cristobal shops	44,240.69	13,347.00		57,587.69
Equipment, Balboa	50,220.55	70,176.27	20,518.39	90,878.43
Equipment, Cristobal	103,136.11	28,466.07	35,064.60	96,537.58
Total	342,172.22	162,127.38	64,582.99	439,716.61
Fuel oil plants:				
Balboa:				
Pumping plant	30,680.17	4,293.84		34,974.01
Storage tanks	62,897.40	9,076.20		37,562.54
Gasoline storage tank			34,411.06	
Pipe lines	80,035.41	16,849.92		96,885.33
Dock 4	3,300.00	3,300.00		6,600.00
Cristobal:				
Pumping plant	30,784.19	4,317.72		35,101.91
Storage tanks	88,816.36	45,630.54		55,964.53
Steel tank, Mount Hope			38,249.74	
Gasoline storage tank			40,232.63	
Pipe lines	180,339.67	24,792.00		201,913.81
Pipe line from Tank 157			3,217.86	
Total	476,853.20	108,260.22	116,111.29	469,002.13
General storehouses:				
Fixed property	57,299.69	32,912.25		90,211.94
Equipment	43,865.78	5,813.99		49,679.77
Total	101,165.47	38,726.24		139,891.71
Motor transportation division:				
Fixed property	22,286.26	5,478.00		27,764.26
Motor vehicles	34,539.34	107,569.16	145,336.94	3,228.44
Total	56,825.60	113,047.16	145,336.94	24,535.82
Motor car repair shops:				
Fixed property	16,433.33	4,344.00		20,777.33
Equipment	10,762.48	3,815.83	2,189.00	12,389.31
Total	27,195.81	8,159.83	2,189.00	33,166.64
Building division:				
Fixed property	5,633.57	2,291.25		7,924.82
Equipment	27,211.32	9,674.86	24,274.70	12,611.48
Total	32,844.89	11,966.11	24,274.70	20,536.30
Panama Canal press:				
Equipment	20,749.29	4,586.72	10,340.00	14,996.01
Gold quarters:				
Fixed property	60,119.76	228,956.64		89,024.90
New quarters, Balboa			133,557.66	
New quarters, Cristobal			6,911.65	
New quarters, Pedro Miguel			49,002.89	
Nurses' quarters, Gorgas hospital			7.40	
Alterations and improvements			10,571.90	
Total	60,119.76	228,956.64	200,051.50	89,024.90

See footnotes at end of table.

TABLE No. 27-A.—*Funded reserves, fiscal year 1941*—Continued

	Balance July 1, 1940	Accruals	Expenditures	Balance June 30, 1941
Silver quarters:				
Fixed property.....	\$3,527.13	\$32,692.20		\$23,117.12
Bathhouse and cook shed, Camp Biedr.....			\$181.48	
Convert Building No. 400, Gamboa.....			39.28	
Labor barracks, La Boca.....			29,226.27	
New quarters, Silver City.....			22,835.16	
Total.....	3,527.13	32,692.20	52,282.19	23,117.12
District quartermasters' supplies:				
Gasoline stations.....	10,893.45	2,439.00		13,332.45
Equipment.....	15,968.48	276.00		16,244.48
Total.....	26,861.93	2,715.00		29,576.93
Clubhouse business structures:				
Fixed property.....	17,395.69	17,620.14		34,524.22
Bathhouse, Far Fan Beach (completed).....			491.61	
Total.....	17,395.69	17,620.14	491.61	34,524.22
Total, business divisions.....	2,556,015.84	1,095,684.19	866,325.49	2,785,374.54
Contingent balance.....	2,739.66		2,739.66	
Total reserve for replacements.....	3,989,753.56	1,392,021.48	1,570,724.71	3,811,050.33
Total reserve for repairs (table No. 17).....	366,610.01	483,027.47	389,866.56	459,770.92
Total reserve for leave ⁴ (table No. 18).....	420,015.78	1,316,590.43	731,954.99	1,004,651.22
Total, funded reserves (table No. 27).....	4,776,379.35	3,191,639.38	2,692,546.26	5,275,472.47

¹ Balance revised.² Indicates credit balance.³ Indicates credit adjustment.⁴ Less \$250,000.00.

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